CH2M HILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA
95833-2937
Tel 916.920.0300
Fax 916.920.8463

February 6, 2004

Mr. Bob Eller
Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

SUBJECT: APPLICANT'S RESPONSES TO CEC STAFF DATA REQUESTS 1-71
ROSEVILLE ENERGY PARK (03-AFC-01)

Dear Mr. Eller:

Attached are an original and 12 copies of Roseville Electric's responses to the California Energy Commission Staff's Data Requests (1-71) for the Application for Certification for the Roseville Energy Park (03-AFC-01).

If you have any questions about this matter, please contact me at (916) 286-0278.

Sincerely,

Douglas M. Davy, Ph.D.
AFC Project Manager

Attachment

cc: R. Hren
A. Grenier
S. Galati

Application for Certification

Roseville ENERGY Park

03-AFC-01

Responses to CEC Staff Data Requests

1 to 71

Roseville Electric

February 2004

Responses to

California Energy Commission Staff Data Requests 1-71

Dated January 6, 2004

on the

Application for Certification

for the

Roseville Energy Park

Roseville, California
03-AFC-01

Submitted to the
California Energy Commission

Submitted by
Roseville Electric

February 2004

Contents

Introduction

Attached are Roseville Electric's responses to California Energy Commission (CEC) Staff data requests for the Roseville Energy Park (REP) (03-AFC-01). The CEC Staff served these data requests on January 7, 2004, as part of the discovery process for the REP project. The responses in this submittal are formatted by individual discipline or topic area, each with its own title page, so that they can more easily be used and referred to separately as individual evidentiary exhibits during the Decision Phase. Within each discipline area, the responses are presented in the same order as by the CEC Staff and are keyed to the CEC Staff Data Request number. New or revised graphics or tables are numbered in reference to the data request number. (For example, Figure DR15-1 would be the first figure submitted in response to Data Request 15.)

Additional tables, figures, or documents submitted in response to a data request (supporting data, plans, folding graphics etc.) are found at the end of a discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

Responses to

CEC Staff Data Requests

Data Requests 1-7: Air Quality

Application for Certification

for the

Roseville Energy Park

Roseville, California

03-AFC-01

Submitted by

Roseville Electric

February 2004

Technical Area: Air Quality (1-7)

ATC Permit, BACT Review

1 *Please provide a complete copy of the application for an Authority to Construct submitted to the Placer County Air Pollution Control District, which should include a Best Available Control Technology review.*

Response: The ATC application contains project description, air quality, and public health information that is identical to that found in the AFC and, in addition, contains the BACT analysis and application forms required by the District. The following is the BACT analysis that was included as part of the Authority to Construct (ATC) Application submitted to the Placer County Air Pollution Control District. A complete copy of the ATC application will be provided to Staff under separate cover.

The following is the BACT analysis that was included as part of the Authority to Construct (ATC) Application submitted to the Placer County Air Pollution Control District (p 3.1-40 of the ATC permit application):

> The REP project is subject to Placer County Air Pollution Control District regulations that apply to new sources of emissions, to the prohibitory regulations that specify emission standards for individual equipment categories, and to the requirements for evaluation of impacts from toxic air pollutants. The following sections include the evaluation of facility compliance with the applicable District requirements.
>
> Under the regulations that govern new sources of emissions, the REP is required to secure a preconstruction Determination of Compliance from the District, as well as demonstrate continued compliance with regulatory limits when the REP becomes operational. The preconstruction review includes demonstrating that the REP will use best available control technology (BACT) and will provide any necessary emission offsets.
>
> BACT for the applicable pollutants was determined by reviewing the most recent Compilation of California BACT Determinations, CAPCOA (2nd Ed., November 1993) and USEPA's BACT/LAER Clearinghouse. For the gas turbines and duct burners, the District considers BACT to be the most stringent level of demonstrated emission control that is feasible. The REP will use the BACT measures discussed below.
>
> As a BACT measure, the REP will limit the combustion turbine fuels burned to natural gas, a clean burning fuel. Liquid fuels will not be fired at the REP. Burning of liquid fuels in the gas turbine combustors and duct burners would result in greater criteria pollutant emissions than if the units burned only gaseous fuels. This measure acts to minimize the formation of all criteria air pollutants.
>
> BACT for NO_x emissions will be the use of low NO_x emitting equipment and add-on controls. The REP has selected the GE gas turbine equipped with water injection or the Alstom turbine with a dry, low-NO_X burner for NO_x control. The gas turbine will generate a maximum of 25 ppmvd NO_x and 15 ppmvd NO_X, corrected to 15 percent O_2, based on water injection and dry, low-NO_X burner combustors, respectively. In addition, the REP will use a selective catalytic reduction (SCR) system to further reduce

NO_x emissions to 2.0 ppmvd NO_x, corrected to 15 percent O_2 (1-hour average). The District BACT guidelines indicate that BACT from large gas turbines (>23 MMBtu/hr heat input) is an exhaust concentration not to exceed 2-3 ppmvd NO_x, corrected to 15 percent O_2; therefore, the REP will meet the necessary BACT requirements for NO_x. The duct burner will also be exhausted to the SCR system; therefore, BACT for the duct burner is also the stringent 2-3 ppmvd NO_x level, corrected to 15 percent O_2.

BACT for CO emissions will be achieved by use of duct burners with low CO production characteristics. In addition, the REP units will be equipped with oxidation catalysts for further control of CO. The REP has specified a CO limit of 4 ppmvd, corrected to 15 percent O_2, for all load conditions in each combustion turbine. CO emissions from the REP HRSG stacks will meet the District BACT requirements. The CO emission rate from the gas turbines and duct burners, as measured at the HRSG exhaust stacks, will not exceed 4 ppmvd, corrected to 15 percent O_2 during base load and duct firing operations.

BACT for VOC emissions from combustion devices has historically been the use of best combustion practices. In addition, VOC emissions are expected to be further reduced as a result of the proposed CO oxidation catalyst. The amount of reduction is not estimated herein, but recent data indicates that POC reductions on the order of 25-50 percent are routinely seen. With the use of the water injection, CO catalyst, and advanced duct burner design, VOC emissions leaving the HRSG stacks will not exceed 2.0 ppmvd, corrected to 15 percent oxygen. This level of emissions meets the BACT requirements.

BACT for PM_{10} and SO_2 is best combustion practices and the use of gaseous fuels. As mentioned above, use of clean burning natural gas fuel will result in minimal particulate and sulfur dioxide emissions.

Turbine selection

2 Please provide the turbine selection, or a date when the turbine selection will be made.

Response: The lead time for manufacturing the combustion turbine is only about 12 months. Thus, to support the anticipated construction schedule, it would not be necessary to make a final combustion turbine selection until late in 2004. Additionally, a purchase commitment requires payment to the manufacturer of a significant monetary deposit, which in turn would require Roseville City Council approval. For these reasons, and to maintain price competition for the procurement process under the public bidding regulations that apply to the City of Roseville and Roseville Electric, the Applicant has provided all the information required to evaluate two combustion turbine options. The Applicant requests that the CEC review and permit both combustion turbine models and document the conditions in such a way that once an equipment decision is reached, only the applicable conditions would apply.

Startup emissions

3 The startup emission estimates for the GTX 100 are significantly different from previous filings (e.g., Malburg Generation Station). Please provide the source or basis for the startup emission estimates for the GTX 100 turbines.

Response: Startup emissions estimates for the Roseville Energy Park GTX100 alternative were based on manufacturer's data provided by Alstom (now Siemens) coupled with the combined-cycle startup operating assumptions. Attachment AIR-1 includes the manufacturer's part-load emissions data (lb/hr versus percent load) for NO_x, CO, and VOC.[1] Attachment AIR-2 includes the Applicant's detailed calculations for the maximum hourly and total emissions per start for hot, warm, and cold starts. These calculations are somewhat conservative in that they assume no reductions by the SCR and oxidation catalyst until the gas turbine load is greater than 50 percent.

Ammonia slip

4 *Please provide a cost estimate and performance guarantee from a catalyst manufacturer for both a 10 ppm ammonia slip limit and a 5 ppm ammonia slip limit for both turbine configurations.*

Response: The Placer County Air Pollution Control District (PCAPCD) regulations do not require a BACT determination for ammonia slip. In addition, the proposed 10 ppm ammonia slip is well within the PCAPCD significance thresholds in that does not pose a health risk. Furthermore, we believe it would be inappropriate to increase the uncertainty associated with compliance of the 2.0 ppm NO_x limit by simultaneously reducing the ammonia slip level.

We do not believe that a 5 ppm ammonia slip is required by any law, ordinance, regulation or standard and it is irrelevant that another project may be proposing it. Additionally, we do not believe that there is any adverse impact to the environment or public health associated with a 10 ppm ammonia slip that would require mitigation to a lower level. The California Environmental Quality Act (CEQA) specifies that the feasibility of any mitigation need only be evaluated if such mitigation is proposed as part of the project or is necessary to mitigate a specific impact. With respect to ammonia slip, neither condition exists. It is inappropriate to treat ammonia as a regulated pollutant under the Clean Air Act and thereby requiring a BACT analysis.

Construction emission estimates

5 *Please provide the basis for the hourly, daily and annual construction emission estimates. This should include the following:*

a. *The type, size and number of each piece of equipment assumed to be used on site (i.e., 4 x 100 Bhp diesel engine backhoes);*

b. *The duration that each piece (or group) of equipment is assumed to be on site (i.e., 22 days);*

c. *The number of hours of assumed operation for each piece (or group) of equipment that is assumed to be on site (i.e., 8 hours/day);*

d. *The individual emission factors (typically in grams/Bhp-hour) assumed for each piece of equipment that is assumed to be on site for all the major pollutants (NO2, SO2, CO, VOC and PM10);*

[1] The total emissions per start indicated on these charts should be disregarded as they primarily apply simple cycle operation and do not account for the "soak" time necessary to slowly warm the heat recovery steam generators and steam turbine.

e. *All other necessary information and assumptions to verify the hourly, daily and annual construction emission estimates as provided;*

Response: Attachment AIR-3 contains a series of tables and calculations which respond to the questions posed in Data Request 5a through 5e.

Average ozone

6 *Please provide all relevant data concerning the average ozone estimated from 8 am to 4 pm as used in the submitted estimated construction emission impacts ozone-limiting-method.*

Response: An electronic copy of the ozone data has been provided to Staff under separate cover. The North Highlands-Blackfoot Way monitoring station for 2001 was used, as this was the most recent year available. Missing data between one and four hours was interpolated with the data from the surrounding valid hours. Data periods that extended beyond four hours (i.e., five hours or more) were taken directly from the Roseville-North Sunrise Blvd. monitoring station for the periods listed below:

3 / 13 / 2001 0800 - 3 / 14 / 2001 1000
4 / 11 / 2001 0800 - 1400
7 / 30 / 2001 0900 - 1300
10 / 05 / 2001 0900 - 1400
12 / 03 / 2001 0100 - 2400

The average ozone data was calculated as arithmetic average for the time periods from 8:00 am to 4:00 pm.

Emission Reduction Credits

7 *Please provide a complete description of any additional ERCs that have been secured for the project or provide an approximate date by which all ERCs will be identified or procured.*

Response: The Applicant is in active negotiations to secure existing ERCs, either by direct purchase or under option contracts. The Applicant is not currently considering the use of ERCs that have been the subject of recent specific directions from the California Air Resources Board or the federal Environmental Protection Agency relative to the State Implementation Plan. The list of ERCs in Table 8.1G-1 has been amended to reflect this change (filed separately under confidential cover). The Applicant expects to be able to secure 100 percent of the required ERCs no later than the issuance of the Final Determination of Compliance by the Placer County Air Pollution Control Board for this project. As specific ERCs are secured, the Applicant will provide appropriate notification to the CEC including a complete description of the ERCs. The Applicant expects to issue such notifications in the near future.

In addition to securing existing ERCs, the Applicant is engaged in efforts that may lead to the creation of a program of new emission reductions from existing sources that could be applied to this project. As this effort develops, the Applicant will communicate the relevant information on this program to the CEC.

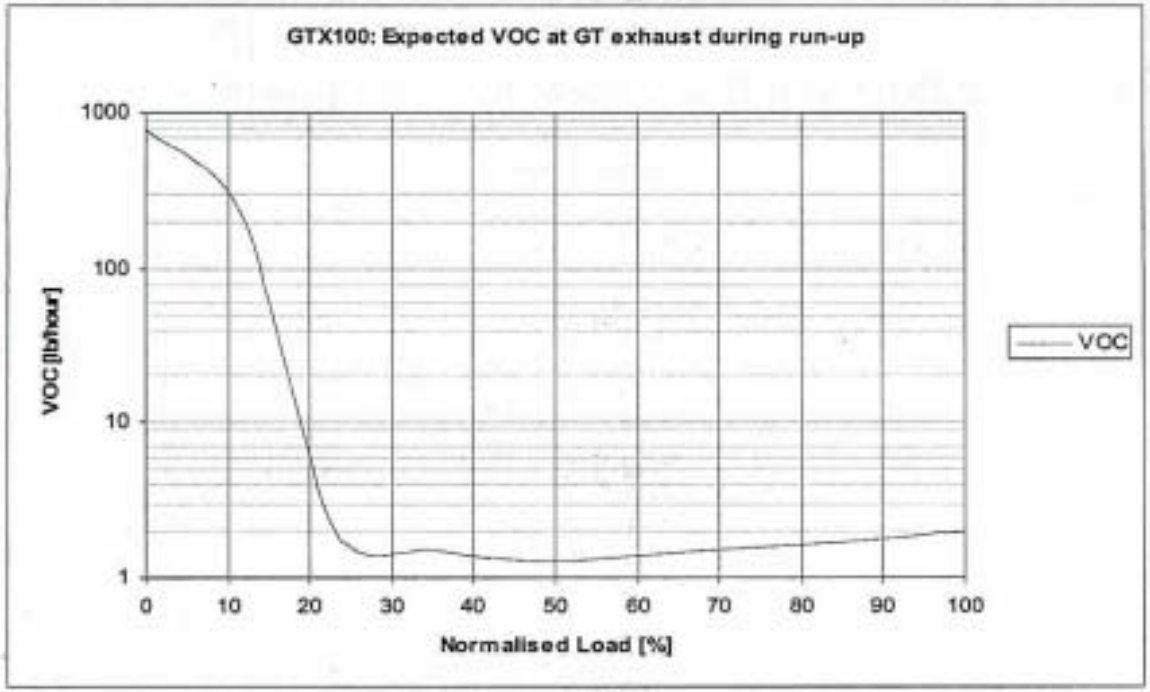
ATTACHMENT AIR-1

Manufacturer's Part-Load Emissions Data

For NO_x, CO, and VOC

VOC emissions during run-up

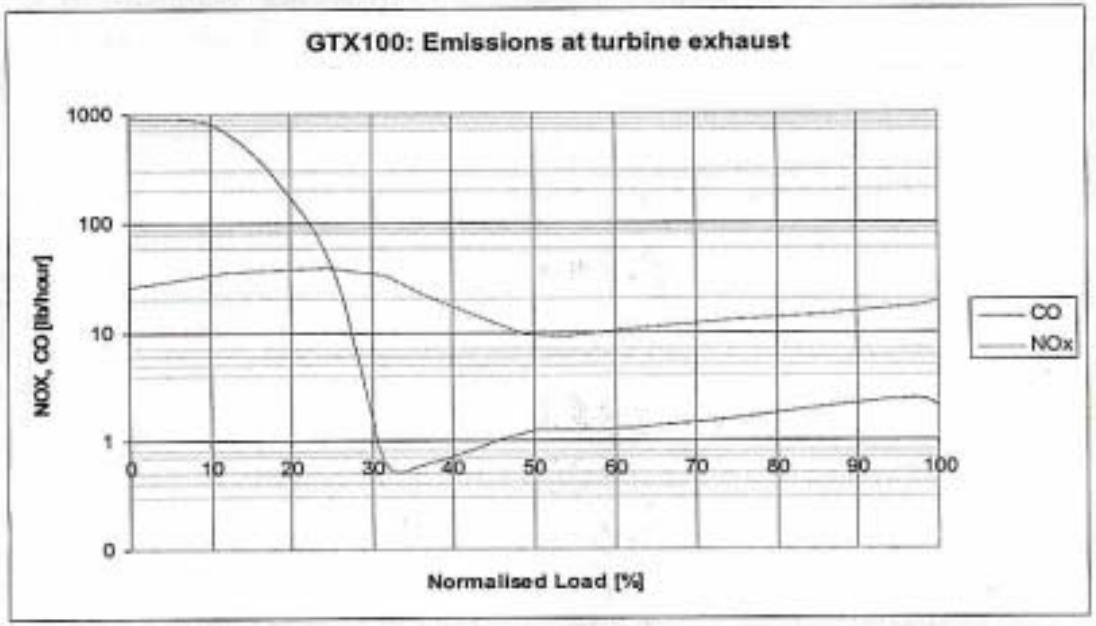
ALSTOM



Estimated total VOC weight during start-up from idle to full load (3 MW/min assumed)
VOC: 17.5 lb

Emissions during run-up

ALSTOM



Estimated total emission weight during start-up from idle to full load (3 MW/sec)

CO: 35 lbs

NOx: 5 lbs

ATTACHMENT AIR-2

Applicant's Calculations for
Maximum Hourly and Total Emissions Per Start

Roseville Energy Park
Hot Start Emissions - Alstom GTX100

	First Combustion Turbine							Second Combustion Turbine							Combined					
Time from Start (minutes)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)
Maximum		39.8	1,000.0	800.0	24.0	176.8	115.9		39.8	1,000.0	800.0	14.5	172.6	115.6	76.8	1,019.2	801.6	37.4	348.2	231.3
1	Purge	-	-	-	23.7	176.5	115.8	Off	-	-	-	13.2	171.0	115.4	-	-	-	36.8	347.5	231.2
2	Purge	-	-	-	23.7	176.5	115.8	Off	-	-	-	13.2	171.1	115.4	-	-	-	37.0	347.7	231.2
3	Purge	-	-	-	23.8	176.6	115.8	Off	-	-	-	13.3	171.2	115.4	-	-	-	37.1	347.8	231.2
4	Purge	-	-	-	23.8	176.7	115.8	Off	-	-	-	13.4	171.2	115.4	-	-	-	37.2	347.9	231.2
5	Purge	-	-	-	23.9	176.8	115.8	Off	-	-	-	13.4	171.3	115.4	-	-	-	37.3	348.1	231.2
6	0%	25.0	1,000.0	800.0	24.0	176.8	115.9	Off	-	-	-	13.5	171.4	115.4	25.0	1,000.0	800.0	37.4	348.2	231.3
7	0%	25.0	1,000.0	800.0	23.6	160.2	102.5	Off	-	-	-	13.5	171.5	115.4	25.0	1,000.0	800.0	37.1	331.7	218.0
8	0%	25.0	1,000.0	800.0	23.2	143.6	89.2	Off	-	-	-	13.6	171.5	115.4	25.0	1,000.0	800.0	36.8	315.2	204.7
9	0%	25.0	1,000.0	800.0	22.9	127.0	75.9	Off	-	-	-	13.6	171.6	115.4	25.0	1,000.0	800.0	36.5	298.6	191.3
10	0%	25.0	1,000.0	800.0	22.5	110.4	62.6	Off	-	-	-	13.7	171.7	115.5	25.0	1,000.0	800.0	36.2	282.1	178.0
11	0%	25.0	1,000.0	800.0	22.2	93.8	49.3	Off	-	-	-	13.8	171.7	115.5	25.0	1,000.0	800.0	35.9	265.6	164.7
12	0%	25.0	1,000.0	800.0	21.8	77.3	35.9	Off	-	-	-	13.8	171.8	115.5	25.0	1,000.0	800.0	35.6	249.1	151.4
13	4%	29.0	920.0	600.0	21.4	60.7	22.6	Off	-	-	-	13.9	171.9	115.5	29.0	920.0	600.0	35.3	232.5	138.1
14	8%	32.4	840.0	412.0	21.0	45.4	12.6	Off	-	-	-	13.9	172.0	115.5	32.4	840.0	412.0	34.9	217.3	128.1
15	12%	35.2	660.0	218.0	20.5	31.5	5.8	Off	-	-	-	14.0	172.0	115.5	35.2	660.0	218.0	34.5	203.5	121.3
16	16%	37.4	396.0	53.4	20.0	20.5	2.1	Off	-	-	-	14.0	172.1	115.5	37.4	396.0	53.4	34.1	192.6	117.7
17	20%	39.0	180.0	7.0	19.4	14.0	1.3	Off	-	-	-	14.1	172.2	115.5	39.0	180.0	7.0	33.5	186.2	116.8
18	24%	39.8	72.0	2.8	18.8	11.1	1.2	Purge	-	-	-	14.2	172.2	115.6	39.8	72.0	2.8	33.0	183.3	116.7
19	28%	37.0	19.2	1.6	18.2	9.9	1.1	Purge	-	-	-	14.2	172.3	115.6	37.0	19.2	1.6	32.5	182.2	116.7
20	28%	37.0	19.2	1.6	17.7	9.7	1.1	Purge	-	-	-	14.3	172.4	115.6	37.0	19.2	1.6	32.0	182.1	116.7
21	28%	37.0	19.2	1.6	17.1	9.4	1.1	Purge	-	-	-	14.3	172.4	115.6	37.0	19.2	1.6	31.5	181.9	116.7
22	28%	37.0	19.2	1.6	16.6	9.2	1.1	Purge	-	-	-	14.4	172.5	115.6	37.0	19.2	1.6	31.0	181.7	116.7
23	28%	37.0	19.2	1.6	16.0	8.9	1.1	0%	25.0	1,000.0	800.0	14.5	172.6	115.6	62.0	1,019.2	801.6	30.5	181.5	116.7
24	28%	37.0	19.2	1.6	15.4	8.7	1.1	0%	25.0	1,000.0	800.0	14.1	156.0	102.3	62.0	1,019.2	801.6	29.5	164.7	103.4
25	28%	37.0	19.2	1.6	14.9	8.4	1.0	0%	25.0	1,000.0	800.0	13.7	139.4	89.0	62.0	1,019.2	801.6	28.6	147.8	90.0
26	28%	37.0	19.2	1.6	14.3	8.2	1.0	0%	25.0	1,000.0	800.0	13.4	122.8	75.7	62.0	1,019.2	801.6	27.7	131.0	76.7
27	28%	37.0	19.2	1.6	13.8	7.9	1.0	0%	25.0	1,000.0	800.0	13.0	106.2	62.3	62.0	1,019.2	801.6	26.8	114.1	63.3
28	28%	37.0	19.2	1.6	13.2	7.7	1.0	0%	25.0	1,000.0	800.0	12.7	89.6	49.0	62.0	1,019.2	801.6	25.9	97.3	50.0
29	28%	37.0	19.2	1.6	12.7	7.4	1.0	0%	25.0	1,000.0	800.0	12.3	73.0	35.7	62.0	1,019.2	801.6	25.0	80.5	36.7
30	28%	37.0	19.2	1.6	12.1	7.2	1.0	4%	29.0	920.0	600.0	11.9	56.4	22.4	66.0	939.2	601.6	24.0	63.6	23.3
31	28%	37.0	19.2	1.6	11.5	6.9	1.0	8%	32.4	840.0	412.0	11.5	41.1	12.4	69.4	859.2	413.6	23.1	48.1	13.3
32	28%	37.0	19.2	1.6	11.0	6.7	0.9	12%	35.2	660.0	218.0	11.0	27.2	5.5	72.2	679.2	219.6	22.0	33.9	6.5
33	28%	37.0	19.2	1.6	10.4	6.4	0.9	16%	37.4	396.0	53.4	10.5	16.3	1.9	74.4	415.2	55.0	20.9	22.7	2.8
34	28%	37.0	19.2	1.6	9.9	6.2	0.9	20%	39.0	180.0	7.0	9.9	9.8	1.0	76.0	199.2	8.6	19.8	16.0	1.9
35	28%	37.0	19.2	1.6	9.3	5.9	0.9	24%	39.8	72.0	2.8	9.3	6.8	0.9	76.8	91.2	4.3	18.6	12.8	1.8
36	28%	37.0	19.2	1.6	8.7	5.7	0.9	28%	37.0	19.2	1.6	8.7	5.7	0.9	74.0	38.4	3.2	17.5	11.4	1.8
37	28%	37.0	19.2	1.6	8.2	5.5	0.9	28%	37.0	19.2	1.6	8.2	5.5	0.9	74.0	38.4	3.2	16.4	10.9	1.7
38	28%	37.0	19.2	1.6	7.6	5.2	0.9	28%	37.0	19.2	1.6	7.6	5.2	0.9	74.0	38.4	3.2	15.2	10.4	1.7
39	28%	37.0	19.2	1.6	7.1	5.0	0.8	28%	37.0	19.2	1.6	7.1	5.0	0.8	74.0	38.4	3.2	14.1	9.9	1.7
40	28%	37.0	19.2	1.6	6.5	4.7	0.8	28%	37.0	19.2	1.6	6.5	4.7	0.8	74.0	38.4	3.2	13.0	9.4	1.7
41	28%	37.0	19.2	1.6	5.9	4.5	0.8	28%	37.0	19.2	1.6	5.9	4.5	0.8	74.0	38.4	3.2	11.9	8.9	1.6
42	28%	37.0	19.2	1.6	5.4	4.2	0.8	28%	37.0	19.2	1.6	5.4	4.2	0.8	74.0	38.4	3.2	10.8	8.4	1.6
43	32%	31.0	1.4	1.5	4.8	4.0	0.8	32%	31.0	1.4	1.5	4.8	4.0	0.8	62.0	2.8	3.1	9.7	7.9	1.6
44	36%	23.6	0.6	1.6	4.4	4.0	0.8	36%	23.6	0.6	1.6	4.4	4.0	0.8	47.2	1.2	3.2	8.7	8.0	1.6
45	40%	18.0	0.7	1.5	4.0	4.1	0.8	40%	18.0	0.7	1.5	4.0	4.1	0.8	36.0	1.4	3.0	8.1	8.1	1.5
46	44%	14.8	0.9	1.4	3.8	4.1	0.7	44%	14.8	0.9	1.4	3.8	4.1	0.7	29.6	1.9	2.8	7.6	8.2	1.5
47	48%	11.6	1.2	1.4	3.6	4.2	0.7	48%	11.6	1.2	1.4	3.6	4.2	0.7	23.2	2.4	2.8	7.2	8.3	1.5
48	52%	3.5	4.2	0.7	3.5	4.2	0.7	52%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
49	56%	3.5	4.2	0.7	3.5	4.2	0.7	56%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
50	60%	3.5	4.2	0.7	3.5	4.2	0.7	60%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5

Roseville Energy Park
Hot Start Emissions - Alstom GTX100

	First Combustion Turbine							Second Combustion Turbine							Combined					
Time from Start (minutes)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)
Maximum		39.8	1,000.0	800.0	24.0	176.8	115.9		39.8	1,000.0	800.0	14.5	172.6	115.6	76.8	1,019.2	801.6	37.4	348.2	231.3
51	64%	3.5	4.2	0.7	3.5	4.2	0.7	64%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
52	68%	3.5	4.2	0.7	3.5	4.2	0.7	68%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
53	72%	3.5	4.2	0.7	3.5	4.2	0.7	72%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
54	76%	3.5	4.2	0.7	3.5	4.2	0.7	76%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
55	80%	3.5	4.2	0.7	3.5	4.2	0.7	80%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
56	84%	3.5	4.2	0.7	3.5	4.2	0.7	84%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
57	88%	3.5	4.2	0.7	3.5	4.2	0.7	88%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
58	92%	3.5	4.2	0.7	3.5	4.2	0.7	92%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
59	96%	3.5	4.2	0.7	3.5	4.2	0.7	96%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
60	100%	3.5	4.2	0.7	3.5	4.2	0.7	100%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
Total (lbs)		23.7	176.5	115.8					13.2	171.0	115.4				36.8	347.5	231.2			

Roseville Energy Park
Warm Start Emissions - Alstom GTX100

	First Combustion Turbine							Second Combustion Turbine							Combined					
Time from Start (minutes)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)
Maximum		**39.8**	**1,000.0**	**800.0**	**37.2**	**240.8**	**143.9**		**39.8**	**1,000.0**	**800.0**	**34.9**	**239.9**	**143.9**	**76.8**	**1,019.2**	**801.6**	**70.4**	**474.5**	**287.2**
1	Purge	-	-	-	32.1	239.2	143.8	Off	-	-	-	18.6	232.1	143.2	-	-	-	50.7	471.3	286.9
2	Purge	-	-	-	32.7	239.5	143.8	Off	-	-	-	19.2	232.5	143.2	-	-	-	51.9	471.9	287.0
3	Purge	-	-	-	33.4	239.8	143.8	Off	-	-	-	19.8	232.8	143.2	-	-	-	53.2	472.6	287.0
4	Purge	-	-	-	34.0	240.1	143.8	Off	-	-	-	20.4	233.1	143.3	-	-	-	54.4	473.2	287.1
5	Purge	-	-	-	34.6	240.5	143.9	Off	-	-	-	21.0	233.4	143.3	-	-	-	55.6	473.9	287.1
6	0%	25.0	1,000.0	800.0	35.2	240.8	143.9	Off	-	-	-	21.6	233.7	143.3	25.0	1,000.0	800.0	56.9	474.5	287.2
7	0%	25.0	1,000.0	800.0	35.4	224.4	130.6	Off	-	-	-	22.3	234.1	143.3	25.0	1,000.0	800.0	57.7	458.5	273.9
8	0%	25.0	1,000.0	800.0	35.6	208.1	117.3	Off	-	-	-	22.9	234.4	143.4	25.0	1,000.0	800.0	58.5	442.5	260.6
9	0%	25.0	1,000.0	800.0	35.8	191.7	104.0	Off	-	-	-	23.5	234.7	143.4	25.0	1,000.0	800.0	59.3	426.4	247.3
10	0%	25.0	1,000.0	800.0	36.0	175.4	90.7	Off	-	-	-	24.1	235.0	143.4	25.0	1,000.0	800.0	60.1	410.4	234.1
11	0%	25.0	1,000.0	800.0	36.2	159.0	77.3	Off	-	-	-	24.7	235.3	143.4	25.0	1,000.0	800.0	60.9	394.4	220.8
12	0%	25.0	1,000.0	800.0	36.4	142.7	64.0	Off	-	-	-	25.3	235.7	143.5	25.0	1,000.0	800.0	61.8	378.3	207.5
13	2%	27.0	960.0	700.0	36.6	126.3	50.7	Off	-	-	-	26.0	236.0	143.5	27.0	960.0	700.0	62.6	362.3	194.2
14	4%	29.0	920.0	600.0	36.8	110.7	39.1	Off	-	-	-	26.6	236.3	143.5	29.0	920.0	600.0	63.4	347.0	182.6
15	6%	30.8	880.0	504.0	36.9	95.7	29.1	Off	-	-	-	27.2	236.6	143.5	30.8	880.0	504.0	64.1	332.3	172.7
16	8%	32.4	840.0	412.0	37.0	81.3	20.7	Off	-	-	-	27.8	236.9	143.6	32.4	840.0	412.0	64.8	318.2	164.3
17	10%	34.0	800.0	320.0	37.1	67.6	13.9	Off	-	-	-	28.4	237.3	143.6	34.0	800.0	320.0	65.5	304.9	157.5
18	12%	35.2	660.0	218.0	37.1	54.6	8.6	Off	-	-	-	29.0	237.6	143.6	35.2	660.0	218.0	66.2	292.2	152.2
19	14%	36.4	520.0	116.0	37.2	43.9	5.0	Off	-	-	-	29.7	237.9	143.6	36.4	520.0	116.0	66.8	281.8	148.6
20	16%	37.4	396.0	53.4	37.2	35.6	3.1	Off	-	-	-	30.3	238.2	143.7	37.4	396.0	53.4	67.5	273.8	146.8
21	18%	38.2	288.0	30.2	37.2	29.3	2.2	Off	-	-	-	30.9	238.5	143.7	38.2	288.0	30.2	68.1	267.8	145.9
22	20%	39.0	180.0	7.0	37.2	24.8	1.7	Off	-	-	-	31.5	238.9	143.7	39.0	180.0	7.0	68.7	263.7	145.5
23	22%	39.4	126.0	4.9	37.1	22.1	1.7	Purge	-	-	-	32.1	239.2	143.8	39.4	126.0	4.9	69.2	261.3	145.4
24	24%	39.8	72.0	2.8	37.1	20.4	1.6	Purge	-	-	-	32.7	239.5	143.8	39.8	72.0	2.8	69.8	259.9	145.4
25	26%	39.0	36.4	1.7	37.0	19.5	1.6	Purge	-	-	-	33.4	239.8	143.8	39.0	36.4	1.7	70.4	259.3	145.4
26	28%	37.0	19.2	1.6	36.4	19.0	1.6	Purge	-	-	-	33.9	239.8	143.8	37.0	19.2	1.6	70.4	258.8	145.4
27	28%	37.0	19.2	1.6	35.9	18.7	1.6	Purge	-	-	-	34.5	239.9	143.9	37.0	19.2	1.6	70.3	258.6	145.4
28	28%	37.0	19.2	1.6	35.3	18.5	1.5	0%	25.0	1,000.0	800.0	34.9	239.9	143.9	62.0	1,019.2	801.6	70.2	258.3	145.4
29	28%	37.0	19.2	1.6	34.8	18.2	1.5	0%	25.0	1,000.0	800.0	34.9	223.2	130.6	62.0	1,019.2	801.6	69.7	241.4	132.1
30	28%	37.0	19.2	1.6	34.2	18.0	1.5	0%	25.0	1,000.0	800.0	34.8	206.6	117.3	62.0	1,019.2	801.6	69.0	224.5	118.8
31	28%	37.0	19.2	1.6	33.6	17.7	1.5	0%	25.0	1,000.0	800.0	34.7	189.9	104.0	62.0	1,019.2	801.6	68.3	207.6	105.5
32	28%	37.0	19.2	1.6	33.1	17.5	1.5	0%	25.0	1,000.0	800.0	34.6	173.3	90.7	62.0	1,019.2	801.6	67.6	190.7	92.1
33	28%	37.0	19.2	1.6	32.5	17.2	1.5	0%	25.0	1,000.0	800.0	34.4	156.6	77.3	62.0	1,019.2	801.6	66.9	173.8	78.8
34	28%	37.0	19.2	1.6	32.0	17.0	1.5	0%	25.0	1,000.0	800.0	34.2	140.0	64.0	62.0	1,019.2	801.6	66.2	156.9	65.5
35	28%	37.0	19.2	1.6	31.4	16.7	1.4	2%	27.0	960.0	700.0	34.0	123.3	50.7	64.0	979.2	701.6	65.4	140.0	52.2
36	28%	37.0	19.2	1.6	30.9	16.5	1.4	4%	29.0	920.0	600.0	33.6	107.4	39.1	66.0	939.2	601.6	64.4	123.8	40.5
37	28%	37.0	19.2	1.6	30.3	16.2	1.4	6%	30.8	880.0	504.0	33.1	92.1	29.1	67.8	899.2	505.6	63.4	108.3	30.5
38	28%	37.0	19.2	1.6	29.7	16.0	1.4	8%	32.4	840.0	412.0	32.7	77.5	20.7	69.4	859.2	413.6	62.4	93.5	22.1
39	28%	37.0	19.2	1.6	29.2	15.7	1.4	10%	34.0	800.0	320.0	32.2	63.6	13.8	71.0	819.2	321.6	61.4	79.3	15.2
40	28%	37.0	19.2	1.6	28.6	15.5	1.4	12%	35.2	660.0	218.0	31.7	50.3	8.5	72.2	679.2	219.6	60.3	65.8	9.9
41	28%	37.0	19.2	1.6	28.1	15.2	1.4	14%	36.4	520.0	116.0	31.2	39.4	4.9	73.4	539.2	117.6	59.2	54.6	6.2
42	28%	37.0	19.2	1.6	27.5	15.0	1.3	16%	37.4	396.0	53.4	30.6	30.8	3.0	74.4	415.2	55.0	58.1	45.8	4.3
43	28%	37.0	19.2	1.6	26.9	14.7	1.3	18%	38.2	288.0	30.2	30.1	24.3	2.1	75.2	307.2	31.8	57.0	39.0	3.4
44	28%	37.0	19.2	1.6	26.4	14.5	1.3	20%	39.0	180.0	7.0	29.5	19.5	1.6	76.0	199.2	8.6	55.9	34.0	2.9
45	28%	37.0	19.2	1.6	25.8	14.2	1.3	22%	39.4	126.0	4.9	28.9	16.6	1.5	76.4	145.2	6.5	54.7	30.8	2.8
46	28%	37.0	19.2	1.6	25.3	14.0	1.3	24%	39.8	72.0	2.8	28.3	14.6	1.4	76.8	91.2	4.3	53.6	28.5	2.7
47	28%	37.0	19.2	1.6	24.7	13.7	1.3	26%	39.0	36.4	1.7	27.7	13.5	1.4	76.0	55.6	3.2	52.4	27.2	2.7
48	28%	37.0	19.2	1.6	24.1	13.5	1.3	28%	37.0	19.2	1.6	27.1	12.9	1.4	74.0	38.4	3.2	51.2	26.4	2.6
49	28%	37.0	19.2	1.6	23.6	13.2	1.2	28%	37.0	19.2	1.6	26.5	12.7	1.4	74.0	38.4	3.2	50.1	25.9	2.6
50	28%	37.0	19.2	1.6	23.0	13.0	1.2	28%	37.0	19.2	1.6	26.0	12.4	1.4	74.0	38.4	3.2	49.0	25.4	2.6

Roseville Energy Park
Warm Start Emissions - Alstom GTX100

	First Combustion Turbine							Second Combustion Turbine							Combined					
Time from Start (minutes)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)
Maximum		**39.8**	**1,000.0**	**800.0**	**37.2**	**240.8**	**143.9**		**39.8**	**1,000.0**	**800.0**	**34.9**	**239.9**	**143.9**	**76.8**	**1,019.2**	**801.6**	**70.4**	**474.5**	**287.2**
51	28%	37.0	19.2	1.6	22.5	12.7	1.2	28%	37.0	19.2	1.6	25.4	12.2	1.3	74.0	38.4	3.2	47.9	24.9	2.5
52	28%	37.0	19.2	1.6	21.9	12.5	1.2	28%	37.0	19.2	1.6	24.9	11.9	1.3	74.0	38.4	3.2	46.8	24.4	2.5
53	28%	37.0	19.2	1.6	21.4	12.2	1.2	28%	37.0	19.2	1.6	24.3	11.7	1.3	74.0	38.4	3.2	45.6	23.9	2.5
54	28%	37.0	19.2	1.6	20.8	12.0	1.2	28%	37.0	19.2	1.6	23.7	11.4	1.3	74.0	38.4	3.2	44.5	23.4	2.5
55	28%	37.0	19.2	1.6	20.2	11.7	1.2	28%	37.0	19.2	1.6	23.2	11.2	1.3	74.0	38.4	3.2	43.4	22.9	2.4
56	28%	37.0	19.2	1.6	19.7	11.5	1.1	28%	37.0	19.2	1.6	22.6	10.9	1.3	74.0	38.4	3.2	42.3	22.4	2.4
57	28%	37.0	19.2	1.6	19.1	11.2	1.1	28%	37.0	19.2	1.6	22.1	10.7	1.3	74.0	38.4	3.2	41.2	21.9	2.4
58	28%	37.0	19.2	1.6	18.6	11.0	1.1	28%	37.0	19.2	1.6	21.5	10.4	1.2	74.0	38.4	3.2	40.1	21.4	2.3
59	28%	37.0	19.2	1.6	18.0	10.7	1.1	28%	37.0	19.2	1.6	20.9	10.2	1.2	74.0	38.4	3.2	38.9	20.9	2.3
60	28%	37.0	19.2	1.6	17.4	10.5	1.1	28%	37.0	19.2	1.6	20.4	9.9	1.2	74.0	38.4	3.2	37.8	20.4	2.3
61	28%	37.0	19.2	1.6	16.9	10.2	1.1	28%	37.0	19.2	1.6	19.8	9.7	1.2	74.0	38.4	3.2	36.7	19.9	2.3
62	28%	37.0	19.2	1.6	16.3	10.0	1.1	28%	37.0	19.2	1.6	19.3	9.4	1.2	74.0	38.4	3.2	35.6	19.4	2.2
63	28%	37.0	19.2	1.6	15.8	9.7	1.0	28%	37.0	19.2	1.6	18.7	9.2	1.2	74.0	38.4	3.2	34.5	18.9	2.2
64	28%	37.0	19.2	1.6	15.2	9.5	1.0	28%	37.0	19.2	1.6	18.2	8.9	1.2	74.0	38.4	3.2	33.4	18.4	2.2
65	28%	37.0	19.2	1.6	14.6	9.2	1.0	28%	37.0	19.2	1.6	17.6	8.7	1.1	74.0	38.4	3.2	32.2	17.9	2.1
66	28%	37.0	19.2	1.6	14.1	9.0	1.0	28%	37.0	19.2	1.6	17.0	8.4	1.1	74.0	38.4	3.2	31.1	17.4	2.1
67	28%	37.0	19.2	1.6	13.5	8.7	1.0	28%	37.0	19.2	1.6	16.5	8.2	1.1	74.0	38.4	3.2	30.0	16.9	2.1
68	28%	37.0	19.2	1.6	13.0	8.5	1.0	28%	37.0	19.2	1.6	15.9	7.9	1.1	74.0	38.4	3.2	28.9	16.4	2.1
69	28%	37.0	19.2	1.6	12.4	8.2	1.0	28%	37.0	19.2	1.6	15.4	7.7	1.1	74.0	38.4	3.2	27.8	15.9	2.0
70	28%	37.0	19.2	1.6	11.9	8.0	0.9	28%	37.0	19.2	1.6	14.8	7.4	1.1	74.0	38.4	3.2	26.6	15.4	2.0
71	28%	37.0	19.2	1.6	11.3	7.7	0.9	28%	37.0	19.2	1.6	14.2	7.2	1.1	74.0	38.4	3.2	25.5	14.9	2.0
72	28%	37.0	19.2	1.6	10.7	7.5	0.9	28%	37.0	19.2	1.6	13.7	6.9	1.0	74.0	38.4	3.2	24.4	14.4	1.9
73	28%	37.0	19.2	1.6	10.2	7.2	0.9	28%	37.0	19.2	1.6	13.1	6.7	1.0	74.0	38.4	3.2	23.3	13.9	1.9
74	28%	37.0	19.2	1.6	9.6	7.0	0.9	28%	37.0	19.2	1.6	12.6	6.4	1.0	74.0	38.4	3.2	22.2	13.4	1.9
75	28%	37.0	19.2	1.6	9.1	6.7	0.9	28%	37.0	19.2	1.6	12.0	6.2	1.0	74.0	38.4	3.2	21.1	12.9	1.9
76	28%	37.0	19.2	1.6	8.5	6.5	0.9	28%	37.0	19.2	1.6	11.4	5.9	1.0	74.0	38.4	3.2	19.9	12.4	1.8
77	28%	37.0	19.2	1.6	7.9	6.2	0.8	28%	37.0	19.2	1.6	10.9	5.7	1.0	74.0	38.4	3.2	18.8	11.9	1.8
78	28%	37.0	19.2	1.6	7.4	6.0	0.8	28%	37.0	19.2	1.6	10.3	5.4	1.0	74.0	38.4	3.2	17.7	11.4	1.8
79	28%	37.0	19.2	1.6	6.8	5.7	0.8	28%	37.0	19.2	1.6	9.8	5.2	0.9	74.0	38.4	3.2	16.6	10.9	1.8
80	28%	37.0	19.2	1.6	6.3	5.5	0.8	28%	37.0	19.2	1.6	9.2	4.9	0.9	74.0	38.4	3.2	15.5	10.4	1.7
81	28%	37.0	19.2	1.6	5.7	5.2	0.8	28%	37.0	19.2	1.6	8.6	4.7	0.9	74.0	38.4	3.2	14.4	9.9	1.7
82	28%	37.0	19.2	1.6	5.1	5.0	0.8	28%	37.0	19.2	1.6	8.1	4.4	0.9	74.0	38.4	3.2	13.2	9.4	1.7
83	28%	37.0	19.2	1.6	4.6	4.7	0.8	28%	37.0	19.2	1.6	7.5	4.2	0.9	74.0	38.4	3.2	12.1	8.9	1.6
84	28%	37.0	19.2	1.6	4.0	4.5	0.7	28%	37.0	19.2	1.6	7.0	3.9	0.9	74.0	38.4	3.2	11.0	8.4	1.6
85	50%	3.5	4.2	0.7	3.5	4.2	0.7	30%	35.0	2.0	1.5	6.4	3.7	0.9	38.5	6.2	2.2	9.9	7.9	1.6
86	50%	3.5	4.2	0.7	3.5	4.2	0.7	32%	31.0	1.4	1.5	5.9	3.7	0.8	34.5	5.6	2.3	9.4	8.0	1.6
87	50%	3.5	4.2	0.7	3.5	4.2	0.7	34%	27.0	0.8	1.6	5.4	3.8	0.8	30.5	5.1	2.3	8.9	8.0	1.6
88	50%	3.5	4.2	0.7	3.5	4.2	0.7	36%	23.6	0.6	1.6	5.0	3.8	0.8	27.1	4.8	2.3	8.5	8.1	1.5
89	50%	3.5	4.2	0.7	3.5	4.2	0.7	38%	20.8	0.6	1.5	4.7	3.9	0.8	24.3	4.9	2.3	8.2	8.1	1.5
90	50%	3.5	4.2	0.7	3.5	4.2	0.7	40%	18.0	0.7	1.5	4.4	4.0	0.8	21.5	4.9	2.2	7.9	8.2	1.5
91	50%	3.5	4.2	0.7	3.5	4.2	0.7	42%	16.4	0.8	1.5	4.2	4.0	0.8	19.9	5.0	2.2	7.6	8.2	1.5
92	50%	3.5	4.2	0.7	3.5	4.2	0.7	44%	14.8	0.9	1.4	4.0	4.1	0.8	18.3	5.2	2.1	7.4	8.3	1.5
93	50%	3.5	4.2	0.7	3.5	4.2	0.7	46%	13.2	1.1	1.4	3.8	4.1	0.7	16.7	5.3	2.1	7.2	8.3	1.5
94	50%	3.5	4.2	0.7	3.5	4.2	0.7	48%	11.6	1.2	1.4	3.6	4.2	0.7	15.1	5.4	2.1	7.1	8.4	1.5
95	50%	3.5	4.2	0.7	3.5	4.2	0.7	50%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
96	52%	3.5	4.2	0.7	3.5	4.2	0.7	52%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
97	54%	3.5	4.2	0.7	3.5	4.2	0.7	54%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
98	56%	3.5	4.2	0.7	3.5	4.2	0.7	56%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
99	58%	3.5	4.2	0.7	3.5	4.2	0.7	58%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
100	60%	3.5	4.2	0.7	3.5	4.2	0.7	60%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5

Roseville Energy Park
Warm Start Emissions - Alstom GTX100

Time from Start (minutes)	First Combustion Turbine							Second Combustion Turbine							Combined					
	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)
Maximum		**39.8**	**1,000.0**	**800.0**	**37.2**	**240.8**	**143.9**		**39.8**	**1,000.0**	**800.0**	**34.9**	**239.9**	**143.9**	**76.8**	**1,019.2**	**801.6**	**70.4**	**474.5**	**287.2**
101	62%	3.5	4.2	0.7	3.5	4.2	0.7	62%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
102	64%	3.5	4.2	0.7	3.5	4.2	0.7	64%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
103	66%	3.5	4.2	0.7	3.5	4.2	0.7	66%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
104	68%	3.5	4.2	0.7	3.5	4.2	0.7	68%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
105	70%	3.5	4.2	0.7	3.5	4.2	0.7	70%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
106	72%	3.5	4.2	0.7	3.5	4.2	0.7	72%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
107	74%	3.5	4.2	0.7	3.5	4.2	0.7	74%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
108	76%	3.5	4.2	0.7	3.5	4.2	0.7	76%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
109	78%	3.5	4.2	0.7	3.5	4.2	0.7	78%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
110	80%	3.5	4.2	0.7	3.5	4.2	0.7	80%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
111	82%	3.5	4.2	0.7	3.5	4.2	0.7	82%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
112	84%	3.5	4.2	0.7	3.5	4.2	0.7	84%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
113	86%	3.5	4.2	0.7	3.5	4.2	0.7	86%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
114	88%	3.5	4.2	0.7	3.5	4.2	0.7	88%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
115	90%	3.5	4.2	0.7	3.5	4.2	0.7	90%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
116	92%	3.5	4.2	0.7	3.5	4.2	0.7	92%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
117	94%	3.5	4.2	0.7	3.5	4.2	0.7	94%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
118	96%	3.5	4.2	0.7	3.5	4.2	0.7	96%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
119	98%	3.5	4.2	0.7	3.5	4.2	0.7	98%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
120	100%	3.5	4.2	0.7	3.5	4.2	0.7	100%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
Total (lbs)		**49.0**	**249.4**	**144.8**					**38.4**	**241.8**	**144.4**				**87.4**	**491.2**	**289.2**			

Roseville Energy Park
Cold Start Emissions - Alstom GTX100

	First Combustion Turbine							Second Combustion Turbine							Combined					
Time from Start (minutes)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)
Maximum		40.0	1,000.0	800.0	37.4	355.8	199.3		40.0	1,000.0	800.0	37.0	355.8	199.3	77.0	1,045.0	801.7	74.0	698.6	397.8
1	Purge	-	-	-	31.7	354.2	199.2	Off	-	-	-	12.2	326.5	197.3	-	-	-	43.8	680.7	396.5
2	Purge	-	-	-	32.3	354.5	199.2	Off	-	-	-	12.8	331.3	197.8	-	-	-	45.1	685.8	397.1
3	Purge	-	-	-	32.9	354.8	199.2	Off	-	-	-	13.5	335.2	198.2	-	-	-	46.4	690.0	397.4
4	Purge	-	-	-	33.5	355.2	199.3	Off	-	-	-	14.1	338.2	198.3	-	-	-	47.6	693.3	397.5
5	Purge	-	-	-	34.1	355.5	199.3	Off	-	-	-	14.8	340.7	198.4	-	-	-	48.9	696.2	397.7
6	0%	25.0	1,000.0	800.0	34.7	355.8	199.3	Off	-	-	-	15.4	342.8	198.4	25.0	1,000.0	800.0	50.2	698.6	397.8
7	0%	25.0	1,000.0	800.0	34.9	339.5	186.0	Off	-	-	-	16.1	344.5	198.5	25.0	1,000.0	800.0	51.0	683.9	384.5
8	0%	25.0	1,000.0	800.0	35.1	323.1	172.7	Off	-	-	-	16.8	345.7	198.6	25.0	1,000.0	800.0	51.9	668.8	371.3
9	0%	25.0	1,000.0	800.0	35.3	306.8	159.4	Off	-	-	-	17.4	346.4	198.6	25.0	1,000.0	800.0	52.8	653.2	358.0
10	0%	25.0	1,000.0	800.0	35.5	290.4	146.1	Off	-	-	-	18.1	347.0	198.6	25.0	1,000.0	800.0	53.6	637.4	344.7
11	0%	25.0	1,000.0	800.0	35.7	274.1	132.8	Off	-	-	-	18.7	347.5	198.6	25.0	1,000.0	800.0	54.4	621.6	331.4
12	0%	25.0	1,000.0	800.0	35.9	257.7	119.5	Off	-	-	-	19.3	347.8	198.7	25.0	1,000.0	800.0	55.3	605.5	318.1
13	1%	26.0	980.0	750.0	36.1	241.4	106.2	Off	-	-	-	19.9	348.1	198.7	26.0	980.0	750.0	56.1	589.5	304.9
14	2%	27.0	960.0	700.0	36.3	225.4	93.7	Off	-	-	-	20.6	348.4	198.7	27.0	960.0	700.0	56.9	573.8	292.4
15	3%	28.0	940.0	650.0	36.5	209.7	82.1	Off	-	-	-	21.2	348.8	198.7	28.0	940.0	650.0	57.7	558.5	280.8
16	4%	29.0	920.0	600.0	36.6	194.3	71.3	Off	-	-	-	21.8	349.1	198.8	29.0	920.0	600.0	58.4	543.4	270.0
17	5%	30.0	900.0	550.0	36.8	179.3	61.3	Off	-	-	-	22.4	349.4	198.8	30.0	900.0	550.0	59.2	528.7	260.1
18	6%	30.8	880.0	504.0	36.9	164.6	52.1	Off	-	-	-	23.0	349.7	198.8	30.8	880.0	504.0	59.9	514.4	251.0
19	7%	31.6	860.0	458.0	37.0	150.3	43.8	Off	-	-	-	23.6	350.0	198.9	31.6	860.0	458.0	60.6	500.3	242.6
20	8%	32.4	840.0	412.0	37.1	136.3	36.2	Off	-	-	-	24.3	350.4	198.9	32.4	840.0	412.0	61.3	486.7	235.0
21	9%	33.2	820.0	366.0	37.2	122.6	29.3	Off	-	-	-	24.9	350.7	198.9	33.2	820.0	366.0	62.0	473.3	228.2
22	10%	34.0	800.0	320.0	37.2	109.3	23.2	Off	-	-	-	25.5	351.0	198.9	34.0	800.0	320.0	62.7	460.3	222.2
23	11%	34.6	730.0	269.0	37.3	96.2	17.9	Off	-	-	-	26.1	351.3	199.0	34.6	730.0	269.0	63.4	447.6	216.9
24	12%	35.2	660.0	218.0	37.3	84.4	13.5	Off	-	-	-	26.7	351.6	199.0	35.2	660.0	218.0	64.0	436.0	212.5
25	13%	35.8	590.0	167.0	37.3	73.7	9.9	Off	-	-	-	27.3	352.0	199.0	35.8	590.0	167.0	64.7	425.7	208.9
26	14%	36.4	520.0	116.0	37.4	64.2	7.1	Off	-	-	-	28.0	352.3	199.0	36.4	520.0	116.0	65.3	416.5	206.2
27	15%	37.0	450.0	65.0	37.4	55.9	5.2	Off	-	-	-	28.6	352.6	199.1	37.0	450.0	65.0	65.9	408.5	204.3
28	16%	37.4	396.0	53.4	37.4	48.7	4.2	Off	-	-	-	29.2	352.9	199.1	37.4	396.0	53.4	66.6	401.6	203.2
29	17%	37.8	342.0	41.8	37.4	42.4	3.3	Off	-	-	-	29.8	353.2	199.1	37.8	342.0	41.8	67.2	395.6	202.4
30	18%	38.2	288.0	30.2	37.3	37.0	2.6	Off	-	-	-	30.4	353.6	199.1	38.2	288.0	30.2	67.8	390.6	201.8
31	19%	38.6	234.0	18.6	37.3	32.5	2.1	Off	-	-	-	31.0	353.9	199.2	38.6	234.0	18.6	68.4	386.4	201.3
32	20%	39.0	180.0	7.0	37.3	29.0	1.9	Purge	-	-	-	31.7	354.2	199.2	39.0	180.0	7.0	69.0	383.2	201.1
33	21%	39.2	153.0	5.9	37.3	26.3	1.8	Purge	-	-	-	32.3	354.5	199.2	39.2	153.0	5.9	69.5	380.8	201.0
34	22%	39.4	126.0	4.9	37.2	24.1	1.7	Purge	-	-	-	32.9	354.8	199.2	39.4	126.0	4.9	70.1	378.9	200.9
35	23%	39.6	99.0	3.8	37.2	22.3	1.6	Purge	-	-	-	33.5	355.2	199.3	39.6	99.0	3.8	70.7	377.4	200.9
36	24%	39.8	72.0	2.8	37.1	20.9	1.6	Purge	-	-	-	34.1	355.5	199.3	39.8	72.0	2.8	71.3	376.4	200.9
37	25%	40.0	45.0	1.7	37.1	20.1	1.6	0%	25.0	1,000.0	800.0	34.7	355.8	199.3	65.0	1,045.0	801.7	71.8	375.9	200.9
38	26%	39.0	36.4	1.7	37.1	19.6	1.6	0%	25.0	1,000.0	800.0	34.9	339.5	186.0	64.0	1,036.4	801.7	72.0	359.1	187.6
39	27%	38.0	27.8	1.6	37.0	19.3	1.6	0%	25.0	1,000.0	800.0	35.1	323.1	172.7	63.0	1,027.8	801.6	72.2	342.5	174.3
40	28%	37.0	19.2	1.6	37.0	19.2	1.6	0%	25.0	1,000.0	800.0	35.3	306.8	159.4	62.0	1,019.2	801.6	72.3	326.0	161.0
41	28%	37.0	19.2	1.6	37.0	19.2	1.6	0%	25.0	1,000.0	800.0	35.5	290.4	146.1	62.0	1,019.2	801.6	72.5	309.6	147.7
42	28%	37.0	19.2	1.6	37.0	19.2	1.6	0%	25.0	1,000.0	800.0	35.7	274.1	132.8	62.0	1,019.2	801.6	72.7	293.3	134.4
43	28%	37.0	19.2	1.6	37.0	19.2	1.6	0%	25.0	1,000.0	800.0	35.9	257.7	119.5	62.0	1,019.2	801.6	72.9	276.9	121.1
44	28%	37.0	19.2	1.6	37.0	19.2	1.6	1%	26.0	980.0	750.0	36.1	241.4	106.2	63.0	999.2	751.6	73.1	260.6	107.8
45	28%	37.0	19.2	1.6	37.0	19.2	1.6	2%	27.0	960.0	700.0	36.3	225.4	93.7	64.0	979.2	701.6	73.3	244.6	95.3
46	28%	37.0	19.2	1.6	37.0	19.2	1.6	3%	28.0	940.0	650.0	36.5	209.7	82.1	65.0	959.2	651.6	73.5	228.9	83.6
47	28%	37.0	19.2	1.6	37.0	19.2	1.6	4%	29.0	920.0	600.0	36.6	194.3	71.3	66.0	939.2	601.6	73.6	213.5	72.8
48	28%	37.0	19.2	1.6	37.0	19.2	1.6	5%	30.0	900.0	550.0	36.8	179.3	61.3	67.0	919.2	551.6	73.8	198.5	62.9
49	28%	37.0	19.2	1.6	37.0	19.2	1.6	6%	30.8	880.0	504.0	36.9	164.6	52.1	67.8	899.2	505.6	73.9	183.8	53.7
50	28%	37.0	19.2	1.6	37.0	19.1	1.6	7%	31.6	860.0	458.0	37.0	150.2	43.8	68.6	879.2	459.6	74.0	169.2	45.3

Roseville Energy Park
Cold Start Emissions - Alstom GTX100

	First Combustion Turbine							Second Combustion Turbine							Combined					
Time from Start (minutes)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)
Maximum		40.0	1,000.0	800.0	37.4	355.8	199.3		40.0	1,000.0	800.0	37.0	355.8	199.3	77.0	1,045.0	801.7	74.0	698.6	397.8
51	28%	37.0	19.2	1.6	37.0	18.8	1.6	8%	32.4	840.0	412.0	37.0	135.9	36.2	69.4	859.2	413.6	74.0	154.6	37.7
52	28%	37.0	19.2	1.6	36.9	18.5	1.6	9%	33.2	820.0	366.0	37.0	121.9	29.3	70.2	839.2	367.6	73.9	140.4	30.9
53	28%	37.0	19.2	1.6	36.8	18.2	1.6	10%	34.0	800.0	320.0	37.0	108.2	23.2	71.0	819.2	321.6	73.8	126.4	24.8
54	28%	37.0	19.2	1.6	36.7	17.9	1.6	11%	34.6	730.0	269.0	36.9	94.9	17.9	71.6	749.2	270.6	73.6	112.8	19.5
55	28%	37.0	19.2	1.6	36.5	17.6	1.6	12%	35.2	660.0	218.0	36.8	82.8	13.5	72.2	679.2	219.6	73.3	100.4	15.1
56	28%	37.0	19.2	1.6	36.3	17.3	1.6	13%	35.8	590.0	167.0	36.6	71.8	9.9	72.8	609.2	168.6	72.9	89.0	11.4
57	28%	37.0	19.2	1.6	36.1	17.0	1.6	14%	36.4	520.0	116.0	36.4	62.0	7.1	73.4	539.2	117.6	72.5	78.9	8.7
58	28%	37.0	19.2	1.6	35.8	16.6	1.6	15%	37.0	450.0	65.0	36.2	53.3	5.2	74.0	469.2	66.6	72.0	69.9	6.8
59	28%	37.0	19.2	1.6	35.5	16.3	1.6	16%	37.4	396.0	53.4	35.9	45.8	4.1	74.4	415.2	55.0	71.5	62.1	5.7
60	28%	37.0	19.2	1.6	35.3	16.0	1.6	17%	37.8	342.0	41.8	35.6	39.2	3.3	74.8	361.2	43.4	70.9	55.3	4.9
61	28%	37.0	19.2	1.6	34.9	15.7	1.6	18%	38.2	288.0	30.2	35.3	33.5	2.6	75.2	307.2	31.8	70.2	49.3	4.2
62	28%	37.0	19.2	1.6	34.6	15.4	1.6	19%	38.6	234.0	18.6	34.9	28.8	2.1	75.6	253.2	20.2	69.5	44.2	3.7
63	28%	37.0	19.2	1.6	34.3	15.1	1.6	20%	39.0	180.0	7.0	34.6	24.9	1.8	76.0	199.2	8.6	68.8	40.0	3.4
64	28%	37.0	19.2	1.6	33.9	14.8	1.6	21%	39.2	153.0	5.9	34.2	21.9	1.8	76.2	172.2	7.5	68.1	36.7	3.3
65	28%	37.0	19.2	1.6	33.5	14.5	1.6	22%	39.4	126.0	4.9	33.8	19.3	1.7	76.4	145.2	6.5	67.3	33.8	3.2
66	28%	37.0	19.2	1.6	33.2	14.2	1.6	23%	39.6	99.0	3.8	33.3	17.3	1.6	76.6	118.2	5.4	66.5	31.5	3.2
67	28%	37.0	19.2	1.6	32.8	13.9	1.6	24%	39.8	72.0	2.8	32.9	15.6	1.6	76.8	91.2	4.3	65.7	29.5	3.1
68	28%	37.0	19.2	1.6	32.3	13.6	1.6	25%	40.0	45.0	1.7	32.4	14.4	1.6	77.0	64.2	3.3	64.8	28.0	3.1
69	28%	37.0	19.2	1.6	31.9	13.3	1.6	26%	39.0	36.4	1.7	32.0	13.7	1.6	76.0	55.6	3.2	63.9	27.0	3.1
70	28%	37.0	19.2	1.6	31.5	13.0	1.5	27%	38.0	27.8	1.6	31.5	13.1	1.6	75.0	47.0	3.2	63.0	26.1	3.1
71	28%	37.0	19.2	1.6	30.9	12.7	1.5	28%	37.0	19.2	1.6	30.9	12.7	1.5	74.0	38.4	3.2	61.8	25.5	3.1
72	28%	37.0	19.2	1.6	30.4	12.5	1.5	28%	37.0	19.2	1.6	30.4	12.5	1.5	74.0	38.4	3.2	60.7	25.0	3.0
73	28%	37.0	19.2	1.6	29.8	12.2	1.5	28%	37.0	19.2	1.6	29.8	12.2	1.5	74.0	38.4	3.2	59.6	24.5	3.0
74	28%	37.0	19.2	1.6	29.2	12.0	1.5	28%	37.0	19.2	1.6	29.2	12.0	1.5	74.0	38.4	3.2	58.5	24.0	3.0
75	28%	37.0	19.2	1.6	28.7	11.7	1.5	28%	37.0	19.2	1.6	28.7	11.7	1.5	74.0	38.4	3.2	57.4	23.5	3.0
76	28%	37.0	19.2	1.6	28.1	11.5	1.5	28%	37.0	19.2	1.6	28.1	11.5	1.5	74.0	38.4	3.2	56.3	23.0	2.9
77	28%	37.0	19.2	1.6	27.6	11.2	1.4	28%	37.0	19.2	1.6	27.6	11.2	1.4	74.0	38.4	3.2	55.1	22.5	2.9
78	28%	37.0	19.2	1.6	27.0	11.0	1.4	28%	37.0	19.2	1.6	27.0	11.0	1.4	74.0	38.4	3.2	54.0	22.0	2.9
79	28%	37.0	19.2	1.6	26.5	10.7	1.4	28%	37.0	19.2	1.6	26.5	10.7	1.4	74.0	38.4	3.2	52.9	21.5	2.8
80	28%	37.0	19.2	1.6	25.9	10.5	1.4	28%	37.0	19.2	1.6	25.9	10.5	1.4	74.0	38.4	3.2	51.8	21.0	2.8
81	28%	37.0	19.2	1.6	25.3	10.2	1.4	28%	37.0	19.2	1.6	25.3	10.2	1.4	74.0	38.4	3.2	50.7	20.5	2.8
82	28%	37.0	19.2	1.6	24.8	10.0	1.4	28%	37.0	19.2	1.6	24.8	10.0	1.4	74.0	38.4	3.2	49.6	20.0	2.8
83	28%	37.0	19.2	1.6	24.2	9.7	1.4	28%	37.0	19.2	1.6	24.2	9.7	1.4	74.0	38.4	3.2	48.4	19.5	2.7
84	28%	37.0	19.2	1.6	23.7	9.5	1.4	28%	37.0	19.2	1.6	23.7	9.5	1.4	74.0	38.4	3.2	47.3	19.0	2.7
85	28%	37.0	19.2	1.6	23.1	9.2	1.3	28%	37.0	19.2	1.6	23.1	9.2	1.3	74.0	38.4	3.2	46.2	18.5	2.7
86	28%	37.0	19.2	1.6	22.5	9.0	1.3	28%	37.0	19.2	1.6	22.5	9.0	1.3	74.0	38.4	3.2	45.1	18.0	2.6
87	28%	37.0	19.2	1.6	22.0	8.7	1.3	28%	37.0	19.2	1.6	22.0	8.7	1.3	74.0	38.4	3.2	44.0	17.5	2.6
88	28%	37.0	19.2	1.6	21.4	8.5	1.3	28%	37.0	19.2	1.6	21.4	8.5	1.3	74.0	38.4	3.2	42.8	17.0	2.6
89	28%	37.0	19.2	1.6	20.9	8.2	1.3	28%	37.0	19.2	1.6	20.9	8.2	1.3	74.0	38.4	3.2	41.7	16.5	2.6
90	28%	37.0	19.2	1.6	20.3	8.0	1.3	28%	37.0	19.2	1.6	20.3	8.0	1.3	74.0	38.4	3.2	40.6	16.0	2.5
91	28%	37.0	19.2	1.6	19.7	7.7	1.3	28%	37.0	19.2	1.6	19.7	7.7	1.3	74.0	38.4	3.2	39.5	15.5	2.5
92	28%	37.0	19.2	1.6	19.2	7.5	1.2	28%	37.0	19.2	1.6	19.2	7.5	1.2	74.0	38.4	3.2	38.4	15.0	2.5
93	28%	37.0	19.2	1.6	18.6	7.2	1.2	28%	37.0	19.2	1.6	18.6	7.2	1.2	74.0	38.4	3.2	37.3	14.5	2.4
94	28%	37.0	19.2	1.6	18.1	7.0	1.2	28%	37.0	19.2	1.6	18.1	7.0	1.2	74.0	38.4	3.2	36.1	14.0	2.4
95	28%	37.0	19.2	1.6	17.5	6.7	1.2	28%	37.0	19.2	1.6	17.5	6.7	1.2	74.0	38.4	3.2	35.0	13.5	2.4
96	28%	37.0	19.2	1.6	17.0	6.5	1.2	28%	37.0	19.2	1.6	17.0	6.5	1.2	74.0	38.4	3.2	33.9	13.0	2.4
97	28%	37.0	19.2	1.6	16.4	6.2	1.2	28%	37.0	19.2	1.6	16.4	6.2	1.2	74.0	38.4	3.2	32.8	12.5	2.3
98	28%	37.0	19.2	1.6	15.8	6.0	1.2	28%	37.0	19.2	1.6	15.8	6.0	1.2	74.0	38.4	3.2	31.7	12.0	2.3
99	28%	37.0	19.2	1.6	15.3	5.7	1.1	28%	37.0	19.2	1.6	15.3	5.7	1.1	74.0	38.4	3.2	30.6	11.5	2.3
100	28%	37.0	19.2	1.6	14.7	5.5	1.1	28%	37.0	19.2	1.6	14.7	5.5	1.1	74.0	38.4	3.2	29.4	11.0	2.2

Roseville Energy Park
Cold Start Emissions - Alstom GTX100

	First Combustion Turbine							Second Combustion Turbine							Combined					
Time from Start (minutes)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)
Maximum		40.0	1,000.0	800.0	37.4	355.8	199.3		40.0	1,000.0	800.0	37.0	355.8	199.3	77.0	1,045.0	801.7	74.0	698.6	397.8
101	28%	37.0	19.2	1.6	14.2	5.3	1.1	28%	37.0	19.2	1.6	14.2	5.3	1.1	74.0	38.4	3.2	28.3	10.5	2.2
102	28%	37.0	19.2	1.6	13.6	5.0	1.1	28%	37.0	19.2	1.6	13.6	5.0	1.1	74.0	38.4	3.2	27.2	10.0	2.2
103	28%	37.0	19.2	1.6	13.0	4.8	1.1	28%	37.0	19.2	1.6	13.0	4.8	1.1	74.0	38.4	3.2	26.1	9.5	2.2
104	28%	37.0	19.2	1.6	12.5	4.5	1.1	28%	37.0	19.2	1.6	12.5	4.5	1.1	74.0	38.4	3.2	25.0	9.0	2.1
105	28%	37.0	19.2	1.6	11.9	4.3	1.1	28%	37.0	19.2	1.6	11.9	4.3	1.1	74.0	38.4	3.2	23.8	8.5	2.1
106	28%	37.0	19.2	1.6	11.4	4.0	1.0	28%	37.0	19.2	1.6	11.4	4.0	1.0	74.0	38.4	3.2	22.7	8.0	2.1
107	28%	37.0	19.2	1.6	10.8	3.8	1.0	28%	37.0	19.2	1.6	10.8	3.8	1.0	74.0	38.4	3.2	21.6	7.5	2.0
108	28%	37.0	19.2	1.6	10.2	3.5	1.0	28%	37.0	19.2	1.6	10.2	3.5	1.0	74.0	38.4	3.2	20.5	7.0	2.0
109	29%	36.0	10.6	1.5	9.7	3.3	1.0	29%	36.0	10.6	1.5	9.7	3.3	1.0	72.0	21.2	3.1	19.4	6.5	2.0
110	30%	35.0	2.0	1.5	9.1	3.1	1.0	30%	35.0	2.0	1.5	9.1	3.1	1.0	70.0	4.0	3.0	18.3	6.3	2.0
111	31%	33.0	1.7	1.5	8.6	3.2	1.0	31%	33.0	1.7	1.5	8.6	3.2	1.0	66.0	3.4	3.0	17.2	6.4	1.9
112	32%	31.0	1.4	1.5	8.1	3.2	1.0	32%	31.0	1.4	1.5	8.1	3.2	1.0	62.0	2.8	3.1	16.3	6.5	1.9
113	33%	29.0	1.1	1.6	7.7	3.3	0.9	33%	29.0	1.1	1.6	7.7	3.3	0.9	58.0	2.3	3.1	15.3	6.5	1.9
114	34%	27.0	0.8	1.6	7.2	3.3	0.9	34%	27.0	0.8	1.6	7.2	3.3	0.9	54.0	1.7	3.2	14.5	6.6	1.9
115	35%	25.0	0.6	1.6	6.9	3.4	0.9	35%	25.0	0.6	1.6	6.9	3.4	0.9	50.0	1.1	3.2	13.7	6.8	1.8
116	36%	23.6	0.6	1.6	6.5	3.4	0.9	36%	23.6	0.6	1.6	6.5	3.4	0.9	47.2	1.2	3.2	13.0	6.9	1.8
117	37%	22.2	0.6	1.6	6.2	3.5	0.9	37%	22.2	0.6	1.6	6.2	3.5	0.9	44.4	1.2	3.1	12.3	7.0	1.8
118	38%	20.8	0.6	1.5	5.8	3.6	0.9	38%	20.8	0.6	1.5	5.8	3.6	0.9	41.6	1.3	3.1	11.7	7.1	1.7
119	39%	19.4	0.7	1.5	5.6	3.6	0.9	39%	19.4	0.7	1.5	5.6	3.6	0.9	38.8	1.3	3.0	11.1	7.2	1.7
120	40%	18.0	0.7	1.5	5.3	3.7	0.8	40%	18.0	0.7	1.5	5.3	3.7	0.8	36.0	1.4	3.0	10.6	7.4	1.7
121	41%	17.2	0.8	1.5	5.0	3.7	0.8	41%	17.2	0.8	1.5	5.0	3.7	0.8	34.4	1.5	3.0	10.1	7.5	1.7
122	42%	16.4	0.8	1.5	4.8	3.8	0.8	42%	16.4	0.8	1.5	4.8	3.8	0.8	32.8	1.6	2.9	9.6	7.6	1.6
123	43%	15.6	0.9	1.4	4.6	3.9	0.8	43%	15.6	0.9	1.4	4.6	3.9	0.8	31.2	1.8	2.9	9.2	7.7	1.6
124	44%	14.8	0.9	1.4	4.4	3.9	0.8	44%	14.8	0.9	1.4	4.4	3.9	0.8	29.6	1.9	2.8	8.8	7.8	1.6
125	45%	14.0	1.0	1.4	4.2	4.0	0.8	45%	14.0	1.0	1.4	4.2	4.0	0.8	28.0	2.0	2.8	8.4	7.9	1.6
126	46%	13.2	1.1	1.4	4.0	4.0	0.8	46%	13.2	1.1	1.4	4.0	4.0	0.8	26.4	2.1	2.8	8.1	8.0	1.5
127	47%	12.4	1.1	1.4	3.9	4.1	0.8	47%	12.4	1.1	1.4	3.9	4.1	0.8	24.8	2.2	2.8	7.8	8.1	1.5
128	48%	11.6	1.2	1.4	3.7	4.1	0.7	48%	11.6	1.2	1.4	3.7	4.1	0.7	23.2	2.4	2.8	7.5	8.2	1.5
129	49%	10.8	1.2	1.4	3.6	4.2	0.7	49%	10.8	1.2	1.4	3.6	4.2	0.7	21.6	2.5	2.8	7.2	8.3	1.5
130	50%	3.5	4.2	0.7	3.5	4.2	0.7	50%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
131	51%	3.5	4.2	0.7	3.5	4.2	0.7	51%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
132	52%	3.5	4.2	0.7	3.5	4.2	0.7	52%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
133	53%	3.5	4.2	0.7	3.5	4.2	0.7	53%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
134	54%	3.5	4.2	0.7	3.5	4.2	0.7	54%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
135	55%	3.5	4.2	0.7	3.5	4.2	0.7	55%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
136	56%	3.5	4.2	0.7	3.5	4.2	0.7	56%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
137	57%	3.5	4.2	0.7	3.5	4.2	0.7	57%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
138	58%	3.5	4.2	0.7	3.5	4.2	0.7	58%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
139	59%	3.5	4.2	0.7	3.5	4.2	0.7	59%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
140	60%	3.5	4.2	0.7	3.5	4.2	0.7	60%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
141	61%	3.5	4.2	0.7	3.5	4.2	0.7	61%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
142	62%	3.5	4.2	0.7	3.5	4.2	0.7	62%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
143	63%	3.5	4.2	0.7	3.5	4.2	0.7	63%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
144	64%	3.5	4.2	0.7	3.5	4.2	0.7	64%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
145	65%	3.5	4.2	0.7	3.5	4.2	0.7	65%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
146	66%	3.5	4.2	0.7	3.5	4.2	0.7	66%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
147	67%	3.5	4.2	0.7	3.5	4.2	0.7	67%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
148	68%	3.5	4.2	0.7	3.5	4.2	0.7	68%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
149	69%	3.5	4.2	0.7	3.5	4.2	0.7	69%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
150	70%	3.5	4.2	0.7	3.5	4.2	0.7	70%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5

Roseville Energy Park
Cold Start Emissions - Alstom GTX100

	First Combustion Turbine							Second Combustion Turbine							Combined					
Time from Start (minutes)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	CTG Load (%)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)	NOx (lb/hr)	CO (lb/hr)	VOC (lb/hr)	Rolling 60-min NOx (lb/hr)	Rolling 60-min CO (lb/hr)	Rolling 60-min VOC (lb/hr)
Maximum		**40.0**	**1,000.0**	**800.0**	**37.4**	**355.8**	**199.3**		**40.0**	**1,000.0**	**800.0**	**37.0**	**355.8**	**199.3**	**77.0**	**1,045.0**	**801.7**	**74.0**	**698.6**	**397.8**
151	71%	3.5	4.2	0.7	3.5	4.2	0.7	71%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
152	72%	3.5	4.2	0.7	3.5	4.2	0.7	72%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
153	73%	3.5	4.2	0.7	3.5	4.2	0.7	73%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
154	74%	3.5	4.2	0.7	3.5	4.2	0.7	74%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
155	75%	3.5	4.2	0.7	3.5	4.2	0.7	75%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
156	76%	3.5	4.2	0.7	3.5	4.2	0.7	76%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
157	77%	3.5	4.2	0.7	3.5	4.2	0.7	77%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
158	78%	3.5	4.2	0.7	3.5	4.2	0.7	78%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
159	79%	3.5	4.2	0.7	3.5	4.2	0.7	79%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
160	80%	3.5	4.2	0.7	3.5	4.2	0.7	80%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
161	81%	3.5	4.2	0.7	3.5	4.2	0.7	81%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
162	82%	3.5	4.2	0.7	3.5	4.2	0.7	82%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
163	83%	3.5	4.2	0.7	3.5	4.2	0.7	83%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
164	84%	3.5	4.2	0.7	3.5	4.2	0.7	84%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
165	85%	3.5	4.2	0.7	3.5	4.2	0.7	85%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
166	86%	3.5	4.2	0.7	3.5	4.2	0.7	86%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
167	87%	3.5	4.2	0.7	3.5	4.2	0.7	87%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
168	88%	3.5	4.2	0.7	3.5	4.2	0.7	88%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
169	89%	3.5	4.2	0.7	3.5	4.2	0.7	89%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
170	90%	3.5	4.2	0.7	3.5	4.2	0.7	90%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
171	91%	3.5	4.2	0.7	3.5	4.2	0.7	91%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
172	92%	3.5	4.2	0.7	3.5	4.2	0.7	92%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
173	93%	3.5	4.2	0.7	3.5	4.2	0.7	93%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
174	94%	3.5	4.2	0.7	3.5	4.2	0.7	94%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
175	95%	3.5	4.2	0.7	3.5	4.2	0.7	95%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
176	96%	3.5	4.2	0.7	3.5	4.2	0.7	96%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
177	97%	3.5	4.2	0.7	3.5	4.2	0.7	97%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
178	98%	3.5	4.2	0.7	3.5	4.2	0.7	98%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
179	99%	3.5	4.2	0.7	3.5	4.2	0.7	99%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
180	100%	3.5	4.2	0.7	3.5	4.2	0.7	100%	3.5	4.2	0.7	3.5	4.2	0.7	6.9	8.4	1.5	6.9	8.4	1.5
Total (lbs)		**71.6**	**373.7**	**201.6**					**52.5**	**363.7**	**200.8**				**124.1**	**737.4**	**402.4**			

ATTACHMENT AIR-3

Construction Emissions Estimates Tables

Table 1 CONSTRUCTION PHASE-Equipment Exhaust Emissions

Equip. Type	# On Site	Est. HP Each	Fuel Type	Avg.Load Factor %	Avg.Daily Hours	Adj.Daily Hours	Total Days	Total Hours	Total HP/Hrs
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	
Dozer	1	103	D	59	8	4.72	15	70.8	7292.4
Loader	1	147	D	46.5	8	3.72	25	93.0	13671.0
Scraper	1	267	D	66	8	5.28	15	79.2	21146.4
Grader	1	157	D	57.5	8	4.60	15	69.0	10833.0
Crane	1	194	D	43	8	3.44	220	756.8	146819.2
Forklift	1	175	D	30	8	2.40	220	528.0	92400.0
Backhoe	2	79	D	46.5	8	7.44	60	446.4	35265.6
Dump Truck	1	300	D	38	8	3.04	30	91.2	27360.0
Water Truck	1	150	D	38	8	3.04	90	273.6	41040.0
Service Truck	1	175	D	38	8	3.04	180	547.2	95760.0
Fuel Truck	1	175	D	38	3	1.14	180	205.2	35910.0
Boom Truck	2	194	D	43	8	6.88	60	412.8	80083.2
Concrete Pump	1	161	D	62	6	3.72	60	223.2	35935.2
Port.Air Comp.	1	37	D	48	8	3.84	180	691.2	25574.4
Port. Elec. Gen	1	22	D	74	8	5.92	180	1065.6	23443.2
Port. Light Plant	1	22	D	62	8	4.96	30	148.8	3273.6

(a) Ref: South Coast AQMD-CEQA Handbook, Table A9-8-C
(b) D=diesel, G=gasoline
(c) Ref (a) Table A9-8-D
(d) Ref (a) Table A9-8-C (at 100% load)
(e) Adjusted daily hours at average load factor.
(f) Total estimated days on site from construction schedule.
(g) Total operational hours during construction phase at average load factor.

Table 2
EMISSIONS FACTORS (h) **Equipment Exhaust Data**

Equip. Type	lbs/hp-hr CO	g/hp-hr CO	lbs/hp-hr VOC	g/hp-hr VOC	lbs/hp-hr NOx	g/hp-hr NOx	lbs/hp-hr SOx	g/hp-hr SOx	lbs/hp-hr PM10	g/hp-hr PM10
Dozer	0.011	5.0	0.002	0.9	0.023	10.4	0.002	0.9	0.001	0.5
Loader	0.011	5.0	0.002	0.9	0.023	10.4	0.002	0.9	0.0015	0.7
Scraper	0.011	5.0	0.001	0.5	0.019	8.6	0.002	0.9	0.0015	0.7
Grader	0.008	3.6	0.001	0.5	0.019	8.6	0.002	0.9	0.0015	0.7
Crane	0.009	4.1	0.003	1.4	0.023	10.4	0.002	0.9	0.0015	0.7
Forklift	0.013	5.9	0.003	1.4	0.031	14.1	0.002	0.9	0.0015	0.7
Backhoe	0.015	6.8	0.003	1.4	0.022	10.0	0.002	0.9	0.001	0.5
Dump Truck	0.006	2.7	0.002	0.9	0.021	9.5	0.002	0.9	0.0015	0.7
Water Truck	0.006	2.7	0.002	0.9	0.021	9.5	0.002	0.9	0.0015	0.7
Service Truck	0.006	2.7	0.002	0.9	0.021	9.5	0.002	0.9	0.0015	0.7
Fuel Truck	0.006	2.7	0.002	0.9	0.021	9.5	0.002	0.9	0.0015	0.7
Boom Truck	0.006	2.7	0.002	0.9	0.021	9.5	0.002	0.9	0.0015	0.7
Concrete Pump	0.02	9.1	0.003	1.4	0.024	10.9	0.002	0.9	0.0015	0.7
Port.Air Comp.	0.011	5.0	0.002	0.9	0.018	8.2	0.002	0.9	0.00025	0.1
Port. Elec. Gen	0.011	5.0	0.002	0.9	0.018	8.2	0.002	0.9	0.00025	0.1
Port. Light Plant	0.011	5.0	0.002	0.9	0.018	8.2	0.002	0.9	0.00025	0.1

(h) Ref (a) Table A9-8-A and A9-8-B, South Coast AQMD CEQA Handbook

Table 3

Construction Equipment Emissions

Equip. Type		CO			VOC			NOx			SOx			PM10	
	lbs/hr	lbs/day	tons*	lbs/hr	lbs/day	tons*	lbs/hr	lbs/day	tons*	lbs/hr	lbs/day	tons*	lbs/hr	lbs/day	tons*
Dozer	1.13	5.35	0.04	0.21	0.97	0.01	2.37	11.18	0.08	0.21	0.97	0.01	0.10	0.49	0.00
Loader	1.62	6.02	0.08	0.29	1.09	0.01	3.38	12.58	0.16	0.29	1.09	0.01	0.22	0.82	0.01
Scraper	2.94	15.51	0.12	0.27	1.41	0.01	5.07	26.79	0.20	0.53	2.82	0.02	0.40	2.11	0.02
Grader	1.26	5.78	0.04	0.16	0.72	0.01	2.98	13.72	0.10	0.31	1.44	0.01	0.24	1.08	0.01
Crane	1.75	6.01	0.66	0.58	2.00	0.22	4.46	15.35	1.69	0.39	1.33	0.15	0.29	1.00	0.11
Forklift	2.28	5.46	0.60	0.53	1.26	0.14	5.43	13.02	1.43	0.35	0.84	0.09	0.26	0.63	0.07
Backhoe	2.37	17.63	0.53	0.47	3.53	0.11	3.48	25.86	0.78	0.32	2.35	0.07	0.16	1.18	0.04
Dump Truck	1.80	5.47	0.08	0.60	1.82	0.03	6.30	19.15	0.29	0.60	1.82	0.03	0.45	1.37	0.02
Water Truck	0.90	2.74	0.12	0.30	0.91	0.04	3.15	9.58	0.43	0.30	0.91	0.04	0.23	0.68	0.03
Service Truck	1.05	3.19	0.29	0.35	1.06	0.10	3.68	11.17	1.01	0.35	1.06	0.10	0.26	0.80	0.07
Fuel Truck	1.05	1.20	0.11	0.35	0.40	0.04	3.68	4.19	0.38	0.35	0.40	0.04	0.26	0.30	0.03
Boom Truck	2.33	16.02	0.48	0.78	5.34	0.16	8.15	56.06	1.68	0.78	5.34	0.16	0.58	4.00	0.12
Concrete Pump	3.22	11.98	0.36	0.48	1.80	0.05	3.86	14.37	0.43	0.32	1.20	0.04	0.24	0.90	0.03
Port.Air Comp.	0.41	1.56	0.14	0.07	0.28	0.03	0.67	2.56	0.23	0.07	0.28	0.03	0.01	0.04	0.00
Port. Elec. Gen	0.24	1.43	0.13	0.04	0.26	0.02	0.40	2.34	0.21	0.04	0.26	0.02	0.01	0.03	0.00
Port. Light Plant	0.24	1.20	0.02	0.04	0.22	0.00	0.40	1.96	0.03	0.04	0.22	0.00	0.01	0.03	0.00
		CO			VOC			NOX			SOx			PM10	
Total Tons*	**24.57**	**106.53**	**3.79**	5.53	23.08	0.97	**57.44**	**239.88**	**9.13**	5.26	22.35	0.81	**3.71**	**15.46**	**0.56**
Annual Tons			**2.28**			0.58			**5.48**			0.49			**0.33**

*tons = tons emitted during construction phase

Table 3

Construction Equipment Emissions

Equip. Type		CO			VOC			NOx			SOx			PM10	
	lbs/hr	lbs/day	tons*	lbs/hr	lbs/day	tons*	lbs/hr	lbs/day	tons*	lbs/hr	lbs/day	tons*	lbs/hr	lbs/day	tons*
Dozer	1.13	5.35	0.04	0.21	0.97	0.01	2.37	11.18	0.08	0.21	0.97	0.01	0.10	0.49	0.00
Loader	1.62	6.02	0.08	0.29	1.09	0.01	3.38	12.58	0.16	0.29	1.09	0.01	0.22	0.82	0.01
Scraper	2.94	15.51	0.12	0.27	1.41	0.01	5.07	26.79	0.20	0.53	2.82	0.02	0.40	2.11	0.02
Grader	1.26	5.78	0.04	0.16	0.72	0.01	2.98	13.72	0.10	0.31	1.44	0.01	0.24	1.08	0.01
Crane	1.75	6.01	0.66	0.58	2.00	0.22	4.46	15.35	1.69	0.39	1.33	0.15	0.29	1.00	0.11
Forklift	2.28	5.46	0.60	0.53	1.26	0.14	5.43	13.02	1.43	0.35	0.84	0.09	0.26	0.63	0.07
Backhoe	2.37	17.63	0.53	0.47	3.53	0.11	3.48	25.86	0.78	0.32	2.35	0.07	0.16	1.18	0.04
Dump Truck	1.80	5.47	0.08	0.60	1.82	0.03	6.30	19.15	0.29	0.60	1.82	0.03	0.45	1.37	0.02
Water Truck	0.90	2.74	0.12	0.30	0.91	0.04	3.15	9.58	0.43	0.30	0.91	0.04	0.23	0.68	0.03
Service Truck	1.05	3.19	0.29	0.35	1.06	0.10	3.68	11.17	1.01	0.35	1.06	0.10	0.26	0.80	0.07
Fuel Truck	1.05	1.20	0.11	0.35	0.40	0.04	3.68	4.19	0.38	0.35	0.40	0.04	0.26	0.30	0.03
Boom Truck	2.33	16.02	0.48	0.78	5.34	0.16	8.15	56.06	1.68	0.78	5.34	0.16	0.58	4.00	0.12
Concrete Pump	3.22	11.98	0.36	0.48	1.80	0.05	3.86	14.37	0.43	0.32	1.20	0.04	0.24	0.90	0.03
Port.Air Comp.	0.41	1.56	0.14	0.07	0.28	0.03	0.67	2.56	0.23	0.07	0.28	0.03	0.01	0.04	0.00
Port. Elec. Gen	0.24	1.43	0.13	0.04	0.26	0.02	0.40	2.34	0.21	0.04	0.26	0.02	0.01	0.03	0.00
Port. Light Plant	0.24	1.20	0.02	0.04	0.22	0.00	0.40	1.96	0.03	0.04	0.22	0.00	0.01	0.03	0.00
		CO			VOC			NOX			SOx			PM10	
Total Tons*	**24.57**	**106.53**	**3.79**	5.53	23.08	0.97	**57.44**	**239.88**	**9.13**	5.26	22.35	0.81	**3.71**	**15.46**	**0.56**
Annual Tons			**2.28**			0.58			**5.48**			0.49			**0.33**

*tons = tons emitted during construction phase

Table 4
CONSTRUCTION PHASE-Fugitive Dust Emissions

Total Site Acreage:	6.87	Site Acreage Subject to Construction Activity:	3
Emission Factor:	1.2	tons/acre/month of activity (uncontrolled)	
Month =	720	Hrs (avg)	
lbs/acre/hr =	3.333	uncontrolled TSP emissions	

Construction Site Activity Levels

Hrs/Day:	8
Days/Wk:	5
Day/Month:	22
Months/Construction:	20
Annual Const Hours:	2112
Total Construction Hrs:	3520.0

Uncontrolled TSP Emissions:

lbs/hr:	10.0
lbs/day:	80.0
tons* :	17.6
tons/yr:	10.56

Uncontrolled PM10 Emisisons:

lbs/hr:	6.9
lbs/day:	55.2
tons* :	12.1
tons/yr:	7.3

PM10 Control Techniques

Type	Used	Avg. % PM10 Reduction
Watering	Yes	90%
Surface Sealant	No	0%
Dust Suppressant	No	0%
Speed Control	Yes	30%

% Control: 93.0%

Release Factor: 7.0%

TSP to PM10 Conversion Factor: 0.69

Controlled PM10 Emissions:

lbs/hr:	**0.48**
lbs/day:	**3.86**
tons* :	**0.85**
tons/yr:	**0.51**

Ref: EPA/AP-42, Sections 13.2.3, 13.2.4, 13.2.6
Ref: South Coast AQMD-CEQA Handbook, Table 9-2, Table 11-4
Ref: MRI, 1996
*tons - tons emitted during the construction phase

Table 5 CONSTRUCTION PHASE - Truck Delivery Emissions

Avg # deliveries/day:	5
Avg Haul Distance (miles)	80
VMT/Day:	400
Work days/yr:	264
Total Const Work Days:	440

Emissions Factors (lbs/vmt)

NOx	CO	VOC	SOx	PM10	
0.024	0.0163	0.00237	0.00115	0.00139	Ref: MVE17G Ver. 1.0c, Year 2000, Statewide Avg Values

Daily Emissions (lbs)

NOx	CO	VOC	SOx	PM10
9.600	6.520	0.948	0.460	0.556

Annual Emissions (tons)

NOx	CO	VOC	SOx	PM10
1.267	0.861	0.125	0.061	0.073

Construction Period Emissions (tons)

NOx	CO	VOC	SOx	PM10
2.112	1.434	0.209	0.101	0.122

CONSTRUCTION PHASE - Rail Delivery Emissions

# of Railcars per Delivery:	3	*
Avg # of Rail Deliveries/Month:	1	
Avg In-Basin Haul Distance (miles):	65	
Fuel Consumption (gal/mile/car):	0.33	
Total Fuel Consumption (gal/month):	64.35	
Total Fuel Consumption (gal/year):	772.2	
Total Rail Fuel Consumption (gal/during the total const period):	1287	

Emissions Factors (lbs/1000 gal)

NOx	CO	VOC	SOx	PM10
595	59	22	38	15

Ref: EPA Technical Highlights-Emisisons for Locomtives, 12/97
Ref: Booz-Allen & Hamilton "Locomotive Emission Study", CARB, 1/91

Monthly Emissions (lbs)

NOx	CO	VOC	SOx	PM10
38.29	3.80	1.42	2.45	0.97

Max Daily Emissions (lbs)

NOx	CO	VOC	SOx	PM10
12.76	1.27	0.47	0.82	0.32

Annual Emissions (tons)

NOx	CO	VOC	SOx	PM10
0.230	0.023	0.008	0.015	0.006

Construction Period Emissions (tons)

NOx	CO	VOC	SOx	PM10
0.383	0.038	0.014	0.024	0.010

* Assumes a loaded weight 222 tons, unloaded weight 34 tons.
Ref: BNSF and Union Pacific RR data, Russell City Energy Center AFC, Appendix 8.1.

Table 6
CONSTRUCTION PHASE - Worker Travel - Emissions

Avg # of Workers/Day:	160	
Avg Occupancy/Vehicle:	1.2	
Round Trips/Day:	133	
Avg Roundtrip Distance:	88	miles
VMT/Day:	11733	
VMT/Year:	3097600	
VMT/Const Period:	5162667	

Emissions Factors (lbs/VMT)

NOx	CO	VOC	SOx	PM10	
0.00247	0.021	0.00236	0.000021	0.000058	Ref: MVEI7G, Ver 1.0c, Statewide Avg Values for year 2000 Composite of LDA and LDT

Daily Emissions (lbs)

NOx	CO	VOC	SOx	PM10
28.981	246.400	27.691	0.246	0.681

Monthly Emissions (lbs)

NOx	CO	VOC	SOx	PM10
637.59	5420.80	609.19	5.42	14.97

Annual Emissions (tons)

NOx	CO	VOC	SOx	PM10
3.826	32.525	3.655	0.033	0.090

Construction Period Emissions (tons)

NOx	CO	VOC	SOx	PM10
6.376	54.208	6.092	0.054	0.150

Table 7
CONSTRUCTION PHASE - Emissions Summary

	PM10		**PM10**		
Construction Dust:	0.48	lbs/hr	0.061	g/sec	
	3.86	lbs/day	0.015	annualized g/sec	
	0.85	tons/const period			
	0.51	tons/yr			

		lbs/day	**tons/yr**	**tons/construction period**	**annualized g/sec**
Combustion Equipment:	**NOx**	291.2	10.8	18.0	0.3109
	CO	360.7	35.7	59.5	1.0274
	VOC	52.2	4.4	7.3	0.1258
	SOx	23.9	0.6	1.0	0.0171
	PM10	17.0	0.5	0.8	0.0145

Responses to

CEC Staff Data Requests

Data Requests 8-26: Biological Resources

Application for Certification

for the

Roseville Energy Park

Roseville, California

03-AFC-01

Submitted by

Roseville Electric

February 2004

Technical Area: Biological Resources (8-26)

Biological impacts along the alternative T-line

8 *Proceeding on the assumption that the DWRSP build-out will not occur, provide an assessment of the potential impacts to biological resources associated with construction of the project's transmission line. Graphically, and in tabular format, provide information on the number of poles proposed and the potential impact to biological resources associated with each pole. Vernal pool impacts are defined as ground disturbing, construction-related activities within 250 feet of a vernal pool/swale.*

Response: As discussed in the AFC, the project transmission design configuration involves a direct connection from the REP switchyard to a 60 kV transmission line on Phillip Road that will be permitted and installed as part of the West Roseville Specific Plan (WRSP) development. This configuration would require two transmission poles at Phillip Road, and the potential effects of these two poles are considered in the AFC. To take into account the unlikely possibility that the WRSP might be delayed indefinitely, the AFC also addresses an alternative transmission line routing, extending along Phillip and Fiddyment roads to the Fiddyment Substation. Because it is unlikely that the WRSP will be delayed, RE has not prepared a preliminary design for this transmission route that would include the individual transmission pole locations and, for this reason, it is not possible at this time to provide a definitive analysis of the wetlands and vernal pools that would be located within the potential indirect effect zones of the poles.

The WRSP and annexation of West Roseville were approved by the City of Roseville on February 4, 2003 and it is likely that development of the West Roseville area, including the 60 kV distribution line, will begin soon. The Biological Opinion issued for the WRSP (see Attachment BIO-1) considers the potential effects of development on biological resources along most of the REP alternative transmission line. Between the REP site and Bob Doyle Drive, the effects of the REP alternative transmission line would be similar to those that would occur if Phillip Road were converted to a landscaped collector street with 17-foot-wide lanes, bicycle lanes, and a 25-foot-wide public utility / landscape easement on each side. Between Bob Doyle Drive and Fiddyment Road, the effects of the REP alternative transmission line would be similar to those associated with the low-density residential development under the WRSP. Between Fiddyment Road and the Fiddyment Substation, the effects would be the same as those involved with the expansion of Fiddyment Road to a four-lane arterial with median strip, turn lanes, and landscape / public utility easement corridors on either side. The Biological Opinion for the WRSP, therefore, can serve as an indication or programmatic analysis that addresses the types of potential adverse effects that would be typically associated with installing a transmission line in this location and the types of mitigation measures that would be appropriate for taking those effects into consideration.

Should the West Roseville annexation and development be delayed indefinitely, RE would develop detailed design plans and conduct biological resources inventories along the transmission line route. These inventories would be conducted during the wet season so that an accurate delineation of wetlands and vernal pools and assessment of vernal pool habitat is possible.

Copies of WRSP permitting documents

9 *Provide a copy of the following permits issued for the DWRSP: USFWS Biological Opinion, 2081 and 1603 permits from CDFG, 404 Clean Water Act permit from the USACE, and 401 Certification from the Regional Water Quality Control Board.*

Response: The Biological Opinion for the WRSP (West Park/Fiddyment Ranch Project) is attached (Attachment BIO-1). Also attached is a summary of the permitting status of the wetland and biological resources permits for the WRSP, prepared by the WRSP's environmental consultant, ECORP Consulting (Attachment BIO-2). As the letter indicates, the developers of West Roseville will apply for CDFG 1603 permits for specific phases of construction as construction approaches. The Corps of Engineers has recently (February 4, 2004) issued a draft 404 Clean Water Act Permit. The Applicant will provide a copy of this permit to the CEC as soon as a copy is available.

Letter to USFWS and copy of 10(a)(1)(a) permit

10 *Provide a copy of the letter notifying the USFWS that protocol level vernal pool branchiopod surveys were conducted for the proposed REP. Include a copy of the surveyor(s) 10(a)(1)(a) permit for endangered or threatened vernal pool branchiopods.*

Response: Copies of the letter to the USFWS informing them of Dr. Helm's impending protocol-level vernal pool branchiopod survey and of Dr. Helm's 10(a)(1)(a) permit are attached (Attachment BIO-3**).**

Dry season vernal pool branchiopod survey results

11 *Provide the analysis for the dry season vernal pool branchiopod surveys and a discussion of the results*

Response: The dry season vernal pool branchiopod survey report is attached (Attachment BIO-4).

Wet-season vernal pool survey results

12 *Provide results from the wet season surveys scheduled for December 2003. Include a discussion of the protocol level survey that was used. Provide a list of survey personnel, and the dates surveys were conducted. Include the amounts of precipitation recorded on the project site up to the date of branchiopod surveys conducted for the REP. Include the water depth and duration of inundation for wetlands on the proposed site.*

Response: The wet-season vernal pool sampling and analysis is in progress. RE will file the report of this sampling when complete.

Wetland terms and sources

13 *Provide definitions, in the context of the REP AFC, for: seasonal wetland pool, seasonal wetland swale, vernal pool, and seasonal wetland. For the definitions provided, list the source(s) from which the definitions were derived.*

Response: Seasonal wetlands, as defined in context of the REP AFC, are described in the U.S. Army Corps of Engineers Wetland Delineation Manual[2] as "depressional areas that have wetland indicators of all three parameters during the wetter portion of the growing season, but normally lack wetland indicators of hydrology and/or vegetation during the drier portion of the growing season." In the REP AFC, seasonal wetlands are further characterized as seasonal wetland pools and seasonal wetland swales. These terms are used to describe the seasonal features and are defined as follows:

- Seasonal wetland pools are depressions or low-spots that demonstrate the characteristics of seasonal wetlands (as defined above) and can be delineated with a definite polygonal shape.

- Seasonal wetland swales are low areas that demonstrate the characteristics of seasonal wetlands and act as drainageways connecting two or more seasonal wetland pools.

Vernal pools are defined in the U.S. Fish and Wildlife Service Interim Survey Guidelines for Listed Vernal Pool Branchiopods[3] as follows: "

> Vernal pools are ephemeral wetlands that form in areas of California with Mediterranean climates that have shallow depressions underlain by a substrate of hardpan, clay, or basalt near the surface that restricts the percolation of water. They may be characterized by a barrier to overland flow that causes water to collect and pond. Initially, the dry soil in vernal pools becomes wet and starts to saturate during the fall and early winter rains. The second stage in a typical vernal pool cycle is characterized by peak rainfall and inundation of the vernal pools. Vernal pools may remain inundated until spring or early summer, sometimes drying more than once during the wet season.

Furthermore, vernal pools are distinguished from seasonal wetlands in that vernal pools will generally support a dominance of hydrophytic plant species including a minimum of 30% of total pool species being plant species endemic to vernal pools[4].

Define and discuss the clay hardpan substrate

14 *Define the substrate (i.e. clay, hardpan) comprising the layer restricting percolation of water at the proposed REP project site. Include a discussion of the extent and distribution of this layer throughout the underlying areas of the proposed project site*

Response: The soil series present at the project site are the Cometa-Ramona sandy loams and the Xerofluvents, hardpan substratum. The Natural Resources Conservation Service soil survey

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[2] Environmental Laboratory. (1987). "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Corps of Engineer Waterways Experiment Station, Vicksburg, Miss.

[3] U.S. Fish and Wildlife Service. April 19, 1996. Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods. Online webpage: http://ventura.fws.gov/SurveyProt/shrimp.htm

[4] U.S. Army Corps of Engineers. October 25, 1996. Appendix B – Specific Habitat Mitigation and Monitoring Guidelines for Vernal Pools *in* Habitat Mitigation and Monitoring Proposal Guidelines. Online webpage: http:// www.spk.usace.army.mil/cespk-co/regulatory/habmitmon.html

indicates that the substrate layer restricting percolation of water is a hardpan[5]. Depth to the hardpan layer ranges between 20 and 36 inches. These soil series are not hydric soils but contain hydric inclusions of Alamo clay in drainageways and depressions which range from 5 to 20 percent of the total soils makeup of the area. The Alamo clay is the hardpan substrate restricting water percolation in the vernal pools and seasonal wetlands.

Aerial photographs

15 *Provide color aerial photos, at a scale of 1:2000, or other agreed upon scale, of all on-site wetland features at the proposed project site after 2003 winter/spring inundation. Based on the area of wetland features after inundation, provide the number (in acres) for each wetland feature on the proposed REP site, and a grand total (in acres) for all wetland features on the proposed site.*

Response: Per discussions with Staff at the January 28, 2004 CEC Data Request Workshop, Applicant will obtain copies of the aerial photographs and wetland delineations prepared for a previous project (Enron Corporation's Roseville Energy Facility) that was proposed for the REP site. The Applicant will use these photographs (and previous delineation boundaries) as an important data source in preparing the final determination of jurisdictional wetlands at the site and for defining potential habitat for listed species of vernal pool branchiopods, if present. These activities are currently underway and the results of our wetlands determination will be submitted to CEC Staff under separate cover.

CWA Section 404 permit application

16 *Provide a copy of the Section 404 permit application submitted to the USACE. Provide the name and telephone number of the person assigned as lead for the project. Also indicate status of the USACE verification of the REP wetland delineation*

Response: Field work and verification to delineate wetlands and vernal pools at the project site is on-going. Once the verification is complete, RE will make a formal application for a permit under Section 404 of the Clean Water Act. The USACE contact for the project is Mr. Will Ness, U.S. Army Corps of Engineers, Sacramento District (916) 557-5268.

Status of consultation with CDFG

17 *Indicate the status of consultations with the California Department of Fish and Game. Provide the date contact was initiated and the name and telephone number of the individual appointed as lead for the project.*

Response: Consultation with California Department of Fish and Game was initiated on January 27, 2004. The contact that would oversee projects in Placer County is Mr. Jason Holley, (916) 984-7123.

USFWS lead and status of BA

18 *Provide the name and telephone number of the individual USFWS appointed as lead for the proposed REP project. Provide the date consultation was initiated. Also indicate the status of the Biological Assessment needed for the proposed REP.*

[5] Rogers, John H. 1980. Soil Survey of Placer County, California Western Part. U.S. Department of Agriculture, Soil Conservation Service in cooperation with the university of California Agricultural Experimentation Station, Davis, CA.

Response: The USFWS contact for the REP project is Mrs. Betty Warne, (916) 414-6600. Mrs. Warne is the acting Branch Chief for the Sacramento Valley. Mrs. Warne was contacted on January 27, 2004. Additionally, the Applicant has sent a letter to USFWS requesting technical assistance. The Biological Assessment will be finalized once the wetland delineation verification is complete.

Status of consultation with NOAA fisheries

19 *Indicate the status of consultations with the National Marine Fisheries Service. Provide the date contact was initiated, and the name and telephone number of the person assigned as lead for the project.*

Response: Consultation with NOAA Fisheries (formerly National Marine Fisheries Service) was initiated on January 27, 2004. The contact for the REP project is Ms. Kelly Finn, (916) 930-3610.

Status of consultation with RWQCB

20 *Indicate the status of consultations with the Regional Water Quality Control Board. Provide the date contact was initiated, and the name and telephone number of the person assigned as lead for the project*

Response: Consultation with RWQCB will take place in connection with the Clean Water Act Section 401 water quality certification that accompanies the Section 404 wetland permit. As indicated in the response to Data Request 16, above, RE will apply for this permit once formal wetland delineation and verification of the delineation have been completed. The contact at the RWQCB is Mr. Patrick Gillum (916) 464-4709.

Swainson's hawk observations

21 *Indicate if Swainson's hawks were observed during summer 2003 surveys, conducted by Tetra Tech (for RE), on the proposed project site and/or surrounding areas.*

Response: Wildlife surveys were conducted on June 23 and 27, and July 28, 2003 (AFC p. 8.2-16). Swainson's hawks were not observed during these surveys. The AFC text on page 8.2-15 is incorrect in stating that Swainson's hawks were seen during summer 2003 surveys for the REP. Swainson's hawks have been observed previously near the project site, however (URS 2001 and Miriam Green 2000).

Survey for Swainson's hawks

22 *Describe the protocol level survey used for Swainson's hawks during the summer 2003 surveys conducted by Tetra Tech.*

Response: A reconnaissance-level field survey was conducted. In addition, recent surveys done on behalf of the WRSP indicating the presence of a nest within two miles of the project, were used.

Wildlife surveys

23 *Indicate if wildlife surveys (other than the summer 2003 wildlife surveys) were conducted for the proposed REP.*

Response: The AFC cites a number of other surveys done in earlier years for the WRSP, Enron Corporation's Roseville Energy Facility, and other projects. The Applicant has also conducted dry- and wet-season sampling surveys for vernal pool branchiopods (see Attachment BIO-3 for dry-season sampling report).

Sensitive plant surveys

24 Indicate when sensitive plant surveys for the proposed REP will be conducted and what the target species will be. Include a phenology table for the target species.

Response: Sensitive plants that may occur on the REP project site include big-scale balsamroot, Bogg's lake hedge hyssop, dwarf downingia, stinkbells, Ahart's dwarf rush, Red Bluff dwarf rush, legenere, pincushion navarretia, Sacramento Orcutt grass, and Sanford's arrowhead. Surveys will take place in late April and early May 2004 per the phenology indicated in Table DR24-1.

Table DR24-1. Sensitive plant species phenology.

Common Name	Scientific Name	Blooming period
Big-scale balsamroot	*Balsamohriza macrolepis* var. *macrolepis*	March-June
Bogg's lake hedge hyssop	*Gratiola heterosepala*	April-August
Dwarf downingia	*Downingia pusilla*	March-May
Stinkbells	*Fritillaria agrestis*	March-June
Ahart's dwarf rush	*Juncus leiospermus* var. *ahartii*	March-May
Red Bluff dwarf rush	*Juncus leiospermus* var. *leiospermus*	March-May
Legenere	*Legenere limosa*	April-June
Pincushion navarretia	*Navarretia myersii* ssp. *myersii*	May
Sacramento Orcutt grass	*rcuttia viscida*	April-July
Sanford's arrowhead	*Sagittaria sanfordii*	May-October

Storm water pond

25 Provide an analysis of the potential risk to birds, attracted to the project's proposed stormwater pond, from collision with project infrastructure. Include in the analysis a discussion of the potential for bird electrocution associated with the project's transmission/distribution lines.

Response: The storm water pond has not been designed to retain storm water, but rather for sediment and contamination control. The pond was designed for these purposes per City of Roseville's request that the project not retain storm water (see AFC Section 8.15.2.5, p. 8.15-15 and 8.15-16). For this reason, we believe that the pond will not become an attractive nuisance for birds, since water will be ponded there only briefly during and shortly after major storm events. Because the birds are unlikely to be attracted in any significant number to the storm water pond and because the project transmission connection is less than 100 feet in length, the project will not pose a significant electrocution hazard to birds.

Training program

26 *Provide a discussion of the training for construction workers and monitors. Include a detailed description of what the training would consist of, personnel required to undergo the training, and the how the training would be administered.*

Response: Training would consist of the following two programs: 1) biological training for monitors, and 2) environmental awareness training for construction personnel.

Biological training for biological monitors would encompass:

- Identification of sensitive and protected resources such as vernal pools, red-legged frogs, Swainson's hawks and their nests, white-tailed kites and their nests.
- Sedimentation and erosion control methods and best management practices
- Permits and permit compliance (including conditions of certification)
- Construction methods
- Monitoring duties
- Agency contacts and project contacts
- Regulatory jurisdictions and consequences of permit violations

Training for biological monitors would be administered by workshops and a field visit to the site for specific identification and training.

Environmental awareness training would be held for construction personnel (management and workers) and would encompass the following:

- Role of monitors and monitoring duties
- Description, identification and ecology of sensitive resources and special status species
- Laws and regulations for special status species
- Permits and permit conditions
- Regulatory jurisdictions and consequences of permit violations
- Worker awareness training would involve an on-site workshop before construction begins and would include hand-out materials describing and identifying each special status species, the laws and regulations, and the consequences of violating the permits.

ATTACHMENT BIO-1

Biological Opinion for the West Roseville Specific Plan Area (WestPark/Fiddyment Ranch Project)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-03-F-0013

NOV 20 2003

Mr. Tom Cavanaugh
Chief, Sacramento Valley Office
U. S. Army Corps of Engineers
1325 J Street, Room 1480
Sacramento, California 95814-2922

Subject: Formal Consultation on the proposed Westpark/Fiddyment Ranch Project (File 200200666), Placer County, California

Dear Mr. Cavanaugh:

This is in response to your October 21, 2002, letter requesting initiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Westpark/Fiddyment Ranch project, Placer County, California. Your letter was received on October 23, 2002. The Service has reviewed the biological information submitted by your office describing the effects of the proposed project on the federally endangered vernal pool tadpole shrimp (*Lepidurus packardi*) and the threatened vernal pool fairy shrimp (*Branchinecta lynchi*) and its designated critical habitat. This response is in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(Act).

The Service has determined that the proposed Westpark/Fiddyment Ranch project is not likely to adversely affect the federally threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) or the threatened giant garter snake (*Thamnophis gigas*) because the habitat requirements associated with these species are not present within the proposed project area. The Service's effects determination does not extend to State listed or species of concern such as the Swainson's Hawk (*Buteo swainsonii*) or Burrowing Owl (*Athene cunicularia*), and the applicant is encouraged to seek consultation on potential impacts to these species with the California Department of Fish and Game. The applicant is also reminded that the proposed project should incorporate measures to conserve species protected under the Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755) as amended.

The findings and recommendations in this consultation are based on: (1) Information provided regarding the Notice of Preparation of an Environmental Impact Report for the West Roseville Specific Plan, dated August 16, 2002; (2) information included in the Section 404 Individual Permit Application prepared by ECORP Consulting, dated July 10, 2002; (3) a document titled Supplemental Information for Initiation of Section 7 Consultation for Westpark/Fiddyment Ranch, dated September 17, 2002; (4) a letter dated January 21, 2003, that includes the Response to Service Request for Additional Information; (5) the Wetland Delineation for the Fiddyment Property revised in November 1998, and Placer 1600 Property revised in March 1999 by Gibson and Skordal, Wetland Consultants, Sacramento, California; (6) a letter received from Westpark Associates on August 11, 2003, outlining the proposed compensation measures for the proposed project; (7) additional correspondence and meetings between the Service, ECORP and the applicants; and (8) additional information in Service Files.

Consultation History

November 20, 2001. Meeting with representatives of the City of Roseville, Consultants (ECORP), Applicants (Signature Properties and Westpark Associates (Signature/Westpark)), National Oceanic and Atmospheric Administration-Fisheries, U.S. Army Corps of Engineers, California Department of Fish and Game (CDFG), and the Service to discuss the proposed project and agency concerns. The Service and CDFG commit to developing information regarding western Placer vernal pool conservation.

February 7, 2002. Meeting to present/discuss CDFG/Service strategy for dealing section 7 projects prior to NCCP/HCP development in Western Placer County.

March 28, 2002. Reason Farms site visit. Items discussed included design of retention basins, wetland resource compensation potential for site, potential for vernal pool creation for site. Service discussed pulling back of levee design, site may provide minor restoration potential for vernal pools, on-site creation at Reason Farms not suitable compensation for Roseville Specific Plan effects.

August 16, 2002. A Notice of Preparation (NOP) for the Environmental Impact Report (EIR) for the proposed West Roseville Specific Plan was sent out to the public for comment. We received the document on August 27, 2002.

September 16, 2002. We provided comments to the City of Roseville regarding the Notice of Preparation for the Environmental Impact Report for the West Roseville Specific Plan.

October 23, 2002. We received a request for formal section 7 consultation from the U.S. Army Corps of Engineers (Corps) regarding the proposed project. Along with the request was the permit application, biological assessment and supplemental information for initiation of Section 7 consultation provided by ECORP.

November 4, 2002. Meeting regarding West Roseville Specific Plan. Attending were City of Roseville, Consultants, Applicants, U.S. Army Corps of Engineers, Department of Fish and

Game, and the Service. Discussion involved revisions to plan, update on status of Draft EIR, off-site compensation. Service requested information regarding on-site detention basin.

November 22, 2002. We sent the Corp a letter outlining our concerns regarding the project and requested additional information in order to start consultation. We requested additional information regarding a description of how the proposed action may affect any listed species, a cumulative effects analysis, and a description of the compensation plan.

January 21, 2003. We received a letter from ECORP responding to our concerns on the proposed project. The requested information was not provided in ECORP's response letter.

January 30, 2003. Meeting with applicants, applicant's attorney (Mr. George Kammerer), Department of Fish and Game, and the Service. Items discussed were site description proposed development, wetland resources on-site, compensation options on-site and off-site

April 2, 2003. We received a letter from the applicant's attorney regarding the applicant's revised project description and minimization measures including several off-site conservation areas to compensate for loss of listed species habitat as a result of the proposed project.

April 8, 2003. Meeting to discuss project design, wetland resources on-site, impact and avoidance summary, on-site and off-site compensation components.

May 5, 2003. We received correspondence from the applicant regarding approval of the East Sheridan property and the potential need to compensate outside of Placer County.

May 13, 2003. Meeting to discuss on-site avoidance, review additional information provided, off-site compensation proposal.

May 19, 2003. We received a request from Mr. George Kammerer to provide them with a Draft Biological Opinion including Service proposed "reasonable and prudent alternatives" and measures.

June 3, 2003. Meeting to discuss revised on-site plan, wetland habitat impacted, off-site compensation.

June 6, 2003. We responded to the applicant regarding providing a Draft Biological Opinion for the project, informing the applicant that the proper procedures are for the Corps to request a draft and that they should contact the Corps to make such a request.

June 6, 2003. Ms. Lori Rinek, Mr. Ken Sanchez, and Mr. Arnold Roessler of the Service, Mr. Jeff Finn of the California Department of Fish and Game, Mr. Jim Stewart and Mr. Pete Balfour of ECORP made a site visit to the proposed Yankee Slough preserve.

June 9, 2003. We received a letter from the County of Sacramento requesting the Service to not accept projects in Placer County acquire off-site compensation in Sacramento County.

June 16, 2003. Meeting to discuss compensation alternatives and the Yankee Slough parcel and Swainson Hawk mitigation.

July 8, 2003. We received a letter from the applicant outlining the revised compensation plan and notification for purchasing portions of East Sheridan and Yankee Slough properties in Placer County.

July 8, 2003. We received a facsimile from Mr. Greg Bardini of Morton & Pitalo Inc. regarding the proposed retention basin to be constructed within a proposed vernal pool preserve area on the proposed project site.

July 10, 2003. We received a facsimile from Mr. John Tallman who provided copies of the proposed agreements for purchasing portions of the Sheridan East and Yankee Slough properties.

July 11, 2003. We received a letter from Ms. Kellie Berry of Wildlands Inc. regarding the East Sheridan preservation area and the resources available to the proposed development project.

July 14, 2003. We received a letter from the applicants regarding the on-site avoidance areas and their relationship to the preservation requirements of the project. The applicant believes that the on-site "preserves" should be included as part of their compensation package.

July 14, 2003. Meeting to discuss East Sheridan and Yankee Slough parcels, on-site detention basin issues, on-site preservation credit, indirect compensation requirements.

July 16, 2003. We sent a letter (Service File # 1-1-03-TA-2485) to Mr. Bill Falik of Westpark Associates regarding the July 10, 2003, proposed agreements with Wildlands Inc. and Conservation Resources Inc. for purchasing portions of the Sheridan East and Yankee Slough properties. We also notified the applicant that the issues regarding the detention basin are still outstanding.

July 18, 2003. We received a facsimile from Mr. Bill Falik of Westpark Associates regarding the proposed compensation for the detention basin and bike path within the on-site avoidance area. A revised project description was included in the package.

August 7, 2003. We received a revised project description from the applicant memorializing the compensation acreages as outlined in the Service's July 16. 2003, letter to the applicant.

August 11, 2003. We received a letter from Mr. Bill Falik of Westpark Associates regarding the proposed compensation for the entire development project.

BIOLOGICAL OPINION

Description of the Proposed Action

The proposed Westpark/Fiddyment Ranch Project is located in western Placer County, California, west of Fiddyment Road and north of Baseline Road. Pleasant Grove and Kaseberg Creeks traverse the property. The project site lies within portions of Sections 13, 22, 23, 24, 25, 26, & 27 of Township 11 North, Range 5 East, of the 'Pleasant Grove, California' and Section 18 and 19 of Township 11 North, Range 6 East, of the 'Roseville, California' U.S.G.S. quadrangle maps. The site has been used for livestock grazing and retains its natural topography and hydrology. The applicant, proposes to construct approximately 8,430 low, medium and high density housing units, with supporting infrastructure, numerous commercial facilities, schools, and parks on a 3,142 acre parcel. At issue are the adverse effects of the proposed residential and commercial development project on the endangered vernal pool tadpole shrimp and the threatened vernal pool fairy shrimp and its designated critical habitat.

The proposed project site contains 63.89 wetted acres of wetlands, including 33.91 wetted acres vernal pools and 8.05 wetted acres drainage swales considered habitat for listed vernal pool crustaceans. The area also includes approximately 3.92 wetted acres of seasonal wetlands, 0.62 wetted acres of emergent marsh, as well as the Pleasant Grove Creek and Kaseberg seasonal creek. Approximately 0.49 wetted acre of vernal pools within the proposed project area were directly affected as a result of the Pleasant Grove Waste Water Treatment Plant project (Service File 1-1-01-F-0034), and those effects will not be addressed further in this biological opinion.

The effects on wetland resources of the proposed project are outlined in Table 1 below.

Table 1. Wetland Resources on the Westpark/Fiddyment Ranch Project Area

Classification	Existing (acres)	Preserved	Avoided[1]	Direct	Indirect
Vernal Pools	33.91[2]	19.62	11.26	13.8	8.83
Swales	8.05	4.76	1.72	3.29	0.74
Total	41.96	24.38	12.98	17.09	9.57

[1] acreage within preserve areas not indirectly affected
[2] (0.49 acres under previous Service biological opinion for Pleasant Grove Waste Water Treatment Plant, 1-1-01-F-0034)

The applicant proposes to avoid approximately 699.3 acres of vernal pool grassland habitat, in four separate areas of the proposed project (see Attachment A); an approximately 132.7 acre preserve area at the northwest portion of the Fiddyment Ranch portion of the project; an approximately 162.5 acre preserve area along Pleasant Grove Creek, protecting mostly riparian habitat; an approximately 44.4 acre preserve area along the intermittent unnamed tributary to Pleasant Grove Creek: and 100' corridor along Kaseberg Creek which totals 14.7 acres; and a 345 acre preserve area along the western portion and extending to include numerous swales and

unnamed channels of the Westpark portion of the proposed development. Approximately 24.38 wetted acres of vernal pools and associated swales will be within the avoided areas. The proposed project's direct and indirect effects include 26.66 acres of vernal pool and vernal swale habitat (as outlined in letters dated July 18, 2003, and August 7, 2003, from Mr. Bill Falik). The applicant proposes to compensate for the loss or degradation of 26.66 acres of listed vernal pool crustacean habitat through the following compensation measures.

For Direct and Indirect Effects:

- The preservation component for vernal pools/swales would include preserving approximately 25.48 acres off-site at the Sheridan East property and 1.2 acres at the Yankee Slough property both in Placer County.

- The restoration component for vernal pool/swales would include restoring approximately 43.00 acres vernal pool grassland habitat at the off-site Yankee Slough property.

Additional measures include:

- No preservation credit will be given for the vernal pools/swales within the on-site avoidance areas.

- The Service shall approve the firm performing the restoration and related monitoring on the Yankee Slough property.

- Restoration can be phased to coincide with losses of habitat as a result of development phasing.

- Phase one of the restoration work is to start on the southern-most portion of the Yankee Slough property.

- Conservation Easement. Vernal pool habitat and associated upland habitat preserved on-site will be protected and managed in perpetuity through a Service-approved conservation easement, Service-approved management plan, and sufficient funds to manage and monitor the site in perpetuity in accordance with the management plan. Funding mechanisms for the maintenance and management may be phased to coincide with phased construction of the project. All maintenance and management obligations associated with this project at the off-site Sheridan East parcel and the Yankee Slough parcel shall be conducted by the respective owners as agreed through separate agreements by the applicant approved by the Service. The applicant has secured the endowment funds necessary for the maintenance and management of the Sheridan East and Yankee Slough parcels in perpetuity.

- Prior to ground-breaking, the applicant will provide the Service with verification that the necessary restoration and preservation acreages have been dedicated in a Service-approved preserve area.

Status of the Species

A final rule was published on September 19, 1994 (59 **FR** 48136), to list the vernal pool fairy shrimp as threatened and vernal pool tadpole shrimp as endangered under the Act. The final rule to designate critical habitat for 15 vernal pool species, including the vernal pool fairy shrimp and vernal pool tadpole shrimp, was published on August 6, 2003 (68 **FR** 46684). Further information on the life history and ecology of the vernal pol fairy shrimp and vernal pool tadpole shrimp may be found in the final listing rule, the final rule to designate critical habitat, Eng *et al.* (1990), Helm (1998), Simovich *et al.* (1992), and Volmar (2002). Vernal pool fairy shrimp are restricted to vernal pools, swales, and other seasonal wetlands in California and southern Oregon. Vernal pool tadpole shrimp are restricted to similar habitats in California's Central Valley and San Francisco Bay area.

Vernal pool fairy shrimp. Vernal pool fairy shrimp have delicate elongate bodies; large, stalked, compound eyes; no hard shell (i.e., no carapace); and 11 pairs of swimming legs. Typically less than 2.5 centimeters (cm) (1 inch) long, they swim or glide gracefully upside-down by means of complex, wavelike beating movements while feeding on algae, bacteria, protozoa, rotifers, and detritus. Female vernal pool fairy shrimp carry eggs in a pear-shaped, ventral brood sac until the eggs are either dropped or sink to the pool bottom with the female when she dies. Eggs which remain after pools dry are known as cysts and are able to withstand heat, cold, and prolonged desiccation. When pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch, resulting in a cyst bank in the soil that may include cysts from several breeding seasons (Donald 1983). Vernal pool fairy shrimp develop rapidly and may become sexually mature within two weeks after hatching (Gallagher 1996, Helm 1998). Such quick maturation permits fairy shrimp populations to persist in short-lived, shallow bodies of water (Simovich *et al.* 1992).

Vernal pool fairy shrimp inhabit alkaline pools, ephemeral drainages, rock outcrop pools, ditches, stream oxbows, stock ponds, vernal pools, vernal swales, and other seasonal wetlands (Helm 1998). Occupied habitats range in size from rock outcrop pools as small as one square meter to large vernal pools up to 4.5 hectares (12 acres); the potential ponding depth of occupied habitat ranges from 3 cm (1.2 inches) to 1.2 meters (48 inches). The vernal pool fairy shrimp has been collected from early December to early May.

All known occurrences of vernal pool fairy shrimp inhabit sites in California or southern Oregon. The geographic range of this species encompasses most of the Central Valley from Shasta County to Tulare County and the central coast range from northern Solano County to Santa Barbara County, California; additional disjunct occurrences have been identified in western Riverside County, California, and in Jackson County, Oregon near the city of Medford (CDFG 2000-2003, Helm 1998, Eriksen and Belk 1999, Volmar 2002, Service 1994, Service 2003).

Vernal pool fairy shrimp Critical Habitat

The proposed project lies within the Western Placer County Unit (Unit 12) for the vernal pool fairy shrimp designated on August 6, 2003 (68 **FR** 46684). This critical habitat unit is

approximately 32,134 acres in size and forms one of the remaining large vernal pool complex areas in the Southeastern Sacramento Valley vernal Pool Region (Keeler-Wolf *et al.* 1998). This unit contains occurrences of the vernal pool fairy shrimp and is considered essential for the conservation of the species. The majority of the lands within the unit are privately owned. Several conservation areas set-up to protect vernal pool habitat for the vernal pool fairy shrimp and vernal pool tadpole shrimp have been established within this unit.

In determining which areas to designate as critical habitat, the Service considers those physical and biological features that are essential to a species' conservation and that may require special management considerations or protection (50 CFR §424.12(b)). The Service is required to list the known primary constituent elements together with the critical habitat description. Such physical and biological features include, but are not limited to, the following:

(1) space for individual and population growth, and for normal behavior;

(2) food, water, air, light, minerals, or other nutritional or physiological requirements;

(3) cover or shelter;

(4) sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and

(5) generally, habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

In designating critical habitat for the vernal pool fairy shrimp, the Service identified the following primary constituent elements essential to the conservation of the species:

The first primary constituent element provides the aquatic environment required for cyst incubation and hatching, growth and maturation, reproduction, feeding, sheltering, and dispersal, and the appropriate periods of dessication for cyst dormancy and to eliminate predators such as bullfrogs, fish, and other aquatic predators that depend on year round inundation of wetland habitats to survive. We concluded that this element is essential to the conservation of vernal pool fairy shrimp because the species is ecologically dependent on seasonal fluctuations, such as absence or presence of water during specific times of the year, and duration of inundation (59 **FR** 48136).

The second primary constituent element is essential to maintain the aquatic phase of the vernal pool habitat. The entire vernal pool complex, including the pools, swales, and associated uplands, is essential to support the aquatic functions of the vernal pool habitat. Although the uplands are not actually occupied by vernal pool fairy shrimp, they nevertheless are essential to the conservation of vernal pool habitat and crustaceans because they maintain the aquatic phase of vernal pools and swales. Associated uplands are also essential to provide nutrients that form the basis of the vernal pool food chain, including a primary food source for the vernal pool crustaceans.

The areas designated as vernal pool critical habitat were based on CNDDB (2000-2003) occurrence data, vernal pool mapping, and the vernal pool regions outlined in the California Vernal Pool Assessment Preliminary Report (Keeler-Wolf *et al.* 1998). Placer County is considered within the Southeastern Sacramento Valley Vernal Pool Region. The vernal pool grasslands mapped by Holland (1998b) and Glazner (2001) were used to identify areas which contain the primary constituent elements for the species in Placer County. Site visits, species information, and aerial photography were used to further refine those areas which we consider essential to the conservation of the vernal pool fairy shrimp and to exclude those areas which no longer support the species. As a result of the mapping refinements, approximately 32,134 acres (12,854 hectares) are designated as critical habitat for the vernal pool fairy shrimp in Placer County. The critical habitat within Placer County represents approximately 4.3 percent of the total amount of critical habitat for the 15 vernal pool species in the final rule and approximately 7 percent of the critical habitat designated for the vernal pool fairy shrimp. The critical habitat in western Placer County also represents approximately 84 percent of the critical habitat designated in the Southeastern Sacramento Valley Vernal Pool Region (68 **FR** 46684).

Vernal pool tadpole shrimp. Vernal pool tadpole shrimp have large, shield-like carapaces approximately 1 inch (2.5 cm) long that covers most of their body; dorsal, compound eyes; and a pair of long cercopods, one on each side of a flat caudal plate, at the end of their last abdominal segment. Vernal pool tadpole shrimp are primarily bottom-dwelling animals that move with legs down while feeding on detritus and living organisms, including fairy shrimp and other invertebrates (Pennak 1989). Females deposit cysts (partially developed embryos encased in an egg-like structure) which settle on the pool bottom. Although some cysts may hatch quickly, others remain dormant to hatch during later rainy seasons (Ahl 1991). When winter rains refill inhabited wetlands, tadpole shrimp reestablish from dormant cysts and may become sexually mature within three to four weeks after hatching (Ahl 1991, Helm 1998). Reproductively mature adults may be present in pools until the habitats dry up in the spring (Ahl 1991, Gallagher 1996, Simovich *et al.* 1992).

Vernal pool tadpole shrimp inhabit alkaline pools, clay flats, ditches, freshwater marshes, stream oxbows, vernal lakes, vernal pools, vernal swales, and other seasonal wetlands (Helm 1998). Occupied habitats range in size from vernal pools as small as two square meters to large vernal lakes up to 36 hectares (89 acres); the potential ponding depth of occupied habitat ranges from 4 cm (1.5 inches) to 1.5 meters (59 inches). All known occurrences of vernal pool tadpole shrimp inhabit sites in California. The geographic range of this species encompasses most of (and particularly the eastern side of) the Central Valley from Shasta County to northern Tulare County and the central coast range from Solano County to Alameda County (Service 1994, CDFG 2003). Critical habitat was not designated or proposed for vernal pool tadpole shrimp in western Placer County.

The vernal pool fairy shrimp and tadpole shrimp are ecologically dependent on seasonal fluctuations in their habitat, such as absence or presence of water during specific times of the year, durations of inundation, and other environmental factors that include specific salinity, conductivity, dissolved solids, and pH levels. Water chemistry and soil parent material are two of the most important factors in determining plant and crustacean distribution in vernal pools

(Belk 1977, Holland and Dains 1990, King 1996, Simovich 1998). The genetic characteristics of vernal pool fairy shrimp and vernal pool tadpole shrimp, and the ecological conditions, such as watershed continuity, indicate that populations of these animals are defined by pool complexes rather than by individual vernal pools (Fugate 1992; Keeler-Wolf et al 1998; Service 1994, 2003). Therefore, the most accurate indication of the distribution and abundance of these species is the number of inhabited vernal pool complexes. Individual vernal pools occupied by these species are most appropriately referred to as subpopulations. The pools and, in some cases, pool complexes supporting these species are usually small. Anthropogenic and unforeseen natural catastrophic events such as long-term drought, non-native predators, off-road vehicles, pollution, berming, and urban development, threaten their extirpation at some sites.

Distribution

Vernal pool fairy shrimp. The vernal pool fairy shrimp is known from 33 occurrences extending from the Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County, and along the central coast range from northern Solano County to Pinnacles in San Benito County (Eng *et al.* 1990, Fugate 1992, Sugnet and Associates 1993). Five additional, disjunct populations exist: one near Soda Lake in San Luis Obispo County; one in the mountain grasslands of northern Santa Barbara County; one on the Santa Rosa Plateau in Riverside County, one near Rancho California in Riverside County, and a recently discovered population near Medford, Oregon. Three of these five isolated populations each contain only a single pool known to be occupied by the vernal pool fairy shrimp.

Vernal pool tadpole shrimp. The vernal pool tadpole shrimp is known from 19 occurrences in the Central Valley, ranging from east of Redding in Shasta County south to Fresno County, and from a single vernal pool complex located on the San Francisco Bay National Wildlife Refuge in Alameda County. It inhabits vernal pools containing clear to highly turbid water, ranging in size from 5 square meters (54 square feet) in the Mather Air Force Base area of Sacramento County, to the 36-hectare (89-acre) Olcott Lake at Jepson Prairie in Solano County.

Dispersal

The primary historic dispersal method for the vernal pool tadpole shrimp and vernal pool fairy shrimp may have been large-scale flooding resulting from winter and spring rains which allowed the animals to colonize different individual vernal pools and other vernal pool complexes. This dispersal mechanism may no longer function in some areas due to the construction of dams, levees, and other flood control measures, and widespread urbanization and agricultural conversion of lands within significant portions of the range of this species. Waterfowl and shorebirds are now considered the primary dispersal agents for vernal pool tadpole shrimp and vernal pool fairy shrimp (Simovich *et al.* 1992, Eriksen and Belk 1999). The eggs of these crustaceans are either ingested (Krapu 1974, Swanson *et al.* 1974, Driver 1981, Ahl 1991) and/or adhere to the legs and feathers where they are transported to new habitats.

Environmental Baseline

The main threat to listed vernal pool crustaceans is the loss of habitat associated with human activities, including urban/suburban development, water supply/flood control development, and conversion of natural lands to intensively farmed agricultural uses. Detrimental effects associated with these activities include the physical destruction of wetlands, adverse alteration of hydrology, introduction of toxic substances and insecticides/herbicides, introduction of non-native plants and animals, increased water run-off from residential and commercial development, and illegal dumping of residential materials. State and local laws and regulations do not protect listed vernal pool crustaceans, the other laws and regulations, including the Clean Water Act, have not effectively maintained habitat necessary to conserve and recover these species. Although developmental pressures continue, only a small fraction of vernal pool habitat is protected from the threat of destruction.

Holland (1978) estimated that about two thirds of the grasslands that once supported vernal pools in the Central Valley had been destroyed by 1973 with an associated loss of nearly 75 to over 95 percent of vernal pool habitat. In subsequent years, a substantial amount of the remaining habitat for vernal pool crustaceans has been destroyed with estimates of habitat loss ranging from two to three percent per year (Holland 1998a). Coe (1988) estimated that, between 1988 and 2008, 60 to 70 percent of the remaining vernal pools within the jurisdiction of the U.S. Army Corps of Engineers, Sacramento District would be lost to development.

Occurrences of listed vernal pool crustaceans are highly fragmented throughout their ranges due to the nature of vernal pool landscapes and the destruction of natural habitat by human activities. Such fragmentation results in small, isolated populations which may be more susceptible to extinction due to random demographic, genetic, and environmental events (Gilpin and Soule 1986; Goodman 1987 a,b; Noss *et al.* 2002). Furthermore, if localized extinctions occur in fragmented populations, the opportunity for recolonization of previously occupied habitat is reduced due to the geographic isolation of potential habitats from occupied sites (Noss *et al.* 2002).

Loss of Vernal Pool Habitat in the Southeastern Sacramento Valley Vernal Pool Region. Of the several thousand vernal pools that are located around Sacramento, Coe (1988) has suggested that perhaps 1,800 vernal pools will be impacted due to future development in western Placer County alone. Western Placer County is located in the Southeastern Sacramento Vernal Pool Region, one of 17 vernal pool regions in the State of California defined by the California Department of Fish and Game in the California Vernal Pool Assessment Preliminary Report (Keeler-Wolf *et al.* 1998). The regions were identified according to biological, geomorphological, and soils information. According to the report, "One of the primary assumptions is that these regions are ecologically distinct and that they encompass the full range of variability of vernal pools and species in the state" (Keeler-Wolf *et al.* 1998).

The Southeastern Sacramento Valley Vernal Pool Region contains almost 15% of the remaining vernal pool grasslands in the State of California, and supports 35% of the known occurrences of the vernal pool fairy shrimp documented in the California Natural Diversity Database. It is the

most threatened by development of the 17 regions. Of 155 projects authorized by the Service to take vernal pool fairy shrimp and vernal pool tadpole shrimp since the species were federally listed in 1994, almost 80% (121 projects) were located within the southeastern Sacramento Vernal Pool Region. These projects resulted in the loss of more than 37,500 acres of vernal pool grasslands, out of a total of almost 56,000 acres of uplands containing vernal pool fairy shrimp and vernal pool tadpole shrimp habitat. Close to 20,000 acres of vernal pool grassland habitats have been preserved through the Act since the listing of the vernal pool fairy shrimp and vernal pool tadpole shrimp, yet only 7,000 acres are contained within the Southeastern Sacramento Vernal Pool Region.

Development projects within western Placer County, including the Highland Reserve, Highland Reserve North, Sunset West, Stanford Ranch, Twelve Bridges, Sun City Lincoln Hills, and Stoneridge Specific Plan Area, (Olympus Oaks, Cavitt Ranch projects), have reduced the number of vernal pool complexes within the area. These developments and others within the region, have resulted in both direct and indirect effects to vernal pools, and have contributed to the loss of vernal pool fairy shrimp and vernal pool tadpole shrimp occurrences. Although the reduction of federally listed vernal pool crustacean populations has not been quantified, the acreage of lost habitat continues to grow. General and Specific Plans for the western Placer County area such as the proposed Placer Vineyards, Antonio Mountain Ranch, Three-D project, Whispering Springs, Placer Parkway, and State Route 165 bypass, as well as numerous other proposed housing, industrial, infrastructure, energy facilities, universities, hospitals, and other development projects in and around the city of Lincoln, Rocklin, Roseville and in Placer County have identified significant, unavoidable impacts to biological communities, including elimination of vernal pools, intermittent drainages and other seasonal wetlands. Despite these impacts, city and county governments continue to implement development projects within the area.

Vernal Pool Fairy Shrimp Critical Habitat. Approximately 467,148 acres of critical habitat has been designated for the vernal pool fairy shrimp throughout California and southern Oregon. Portions of the vernal pool wetlands and associated uplands which contain the necessary primary constituent elements within western Placer County have been designated as critical habitat unit 12 (32,134 acres) and are essential for the conservation of vernal pool fairy shrimp. The Placer County unit 12 represents one of the last remaining large vernal pool grassland landscapes in the Southeastern Sacramento Valley and plays an important part in providing connectivity between other vernal pool habitats further to the north and south. The primary dispersal agent for vernal pool fairy shrimp and other crustaceans is transport by waterfowl and other migratory birds. The loss and further fragmentation of existing vernal pool habitats lessens the chance that migratory birds will visit such habitats and as a result, the dispersal rate, colonization, and recolonization of listed vernal pool crustaceans into viable habitats would be affected. Vernal pool fairy shrimp critical habitat will be affected by the same development activities that destroy or alter other vernal pool or ephemeral wetland habitat and/or change the hydrologic patterns within the vernal pool complexes in California and Southern Oregon.

Effects of the Proposed Action

The proposed Westpark/Fiddyment Ranch project would eliminate one of the last remaining intact vernal pool grasslands complexes in western Placer County supporting occurrences of listed vernal pool crustaceans. The proposed project would directly or indirectly affect 26.66 acres of vernal pool habitat for the listed vernal pool crustaceans as follows: 1) result in the direct mortality of all listed vernal pool crustaceans inhabiting 17.09 acres of habitat and indirectly affecting 9.57 acres of habitat within the on-site preserve for listed vernal pool crustaceans; 2) eliminate or degrade over two thousand acres of intact vernal pool grassland supporting vernal pool fairy shrimp; 3) reduce and further fragment one of the largest remaining high quality areas of listed crustacean habitat within the Western Placer area and the Southern Sacramento Vernal Pool Region; and 4) increase construction-related and other human-related disturbances to the listed vernal pool crustaceans. The direct and indirect effects of the project would result in the loss or degradation of over 66 percent of the vernal pools and swales located on the Westpark/Fiddyment Ranch project site.

Direct Effects
The construction of the proposed Westpark/Fiddyment Ranch residential development will result in the direct loss of 17.09 acres of federally listed crustacean habitat, and the death of an unknown number of vernal pool fairy shrimp and vernal pool tadpole shrimp.

Indirect effects
Approximately 9.57 acres of vernal pool tadpole shrimp and vernal pool fairy shrimp habitat avoided on the project site would be adversely affected by the indirect effects of the project. Due to non-existent or inadequate buffers, these avoided pools would be vulnerable to the effects of the surrounding development, including the effects of proposed roads, crossings, a detention basin, bike trails, paths and access roads through the project area and the commercial, residential, school, and park land uses associated with the proposed project. Indirect effects associated with the proposed Westpark/Fiddyment Ranch project include erosion, changes in hydrology, human-related disturbance, degradation of the upland areas, and introduction of pollutants.

Changes in hydrology. The proposed Westpark/Fiddyment Ranch project is likely to alter the hydrology of the remaining vernal pool habitats on the project site. Although vernal pools are typically filled by rain water, vernal pool hydrology can be influenced by a variety of factors. Vernal pool hydrology can be directly altered when swale systems connected to vernal pools are dammed by physical barriers, such as roads and canals or other development. The project also includes creation of an earthen berm detention basin within the swale system within one of the vernal pool preserve areas. These activities will alter vernal pool hydrology both upstream and downstream of the barrier. These components of the proposed Westpark/Fiddyment Ranch project will disturb vernal pool hydrology by altering patterns of overland and subsurface flow.

The proposed project will involve construction of storm water drains and the coverage of land surfaces with concrete, asphalt, and irrigated landscaping. These aspects of the project likely will alter the duration, volume and frequency of surface flows through increased flooding and

runoff. The timing, frequency, and length of inundation of the vernal pool habitat are critical to the fairy shrimp and the vernal pool tadpole shrimp; any substantial hydrologic change in these factors will adversely affect the animals. Alterations in the water regime threaten the vernal pool crustaceans because they can result in: (1) insufficient wetting or premature pool dry-down before the life cycles of the species are completed; (2) flowing water that washes away the cyst bank; (3) altered vernal pool crustacean reproduction and longevity (Helm 1998); and (4) conversion of the vernal pool habitat to a marsh-dominated or a permanent aquatic community, leading to predation of vernal pool crustaceans from the introduction of bullfrogs and fish (Bauder 1986, 1987); and (5) altering the dry season by brief unnatural inundation which may result in premature cyst hatching or destruction.

Human-related disturbance. The proposed Westpark/Fiddyment Ranch development will increase human-related disturbance of vernal pool habitats on the project area. Waste materials from the residential development bordering the proposed on-site preserve areas would be deposited onto preserve area. Pedestrian trails are proposed to border and be within the on-site preserve areas. This access will increase impacts to the preserve from people's activities, including off-trail access, bicycle riding, pets, and trash dumping. De Weese (1998) found that the most frequently observed adverse impacts to vernal pools were human-related activities.

Pollutants. Toxic chemicals, such as petroleum products, pesticides, herbicides, fertilizers and soap, may wash into vernal pools during development of the Westpark/Fiddyment Ranch project area. Contamination of vernal pools from the Westpark/Fiddyment Ranch project area areas may injure or kill vernal pool crustaceans. Vernal pool crustaceans are highly sensitive to the chemistry of their vernal pool habitats (Belk 1977, Eng *et al.* 1990, Gonzalez *et al.* 1996). Vernal pools adjacent to existing developments may be contaminated from roadway contaminants in surface runoff (e.g., grease, oil, and heavy metals). Contamination also may result from increased discharge of contaminants such as fertilizers and pesticides into surface waters from landscaped residential areas (Petrovich 1990). Fertilizer contamination can lead to the eutrophication of vernal pools, which can kill vernal pool crustaceans by reducing the concentration of dissolved oxygen (Rogers 1998).

Habitat fragmentation. In addition to the direct and indirect loss of vernal pool crustacean habitat in this region, the Westpark/Fiddyment Ranch project will contribute to extensive habitat fragmentation of remaining vernal pool habitats in the local area. The proposed Westpark/Fiddyment Ranch project will increase the distance between areas of remaining habitat, thereby reducing the opportunity for recolonization and dispersal between populations of vernal pools crustaceans. Successful colonization may be fairly rare for vernal pool crustaceans (Simovich 1998). The effects of fragmentation in the Southeastern Sacramento Vernal Pool Region have been significant. Extant populations of vernal pool fairy shrimp are increasingly isolated and vulnerable to extirpation from chance events.

As stated earlier, individual vernal pools are unique micro-habitats (Belk 1977, Eng *et al.* 1990, Gonzalez *et al.* 1996, Holland and Griggs 1979, Holland and Dains 1990) based on water chemistry and soil parent material. The conservation of different vernal pool types maintains habitat diversity that promotes genetic diversity (Fugate 1992, King 1996, Fugate 1998, Noss *et*

al. 2002), and reduces the chance of losing disjunct populations of vernal pool fairy shrimp that are important for their genetic uniqueness (Simovich 1998, Platenkamp 1998). Loss of genetic diversity can have significant effects on a population's ability to respond to environmental

change over time (Frankel and Soule 1981). Species that are protected across their ranges have lower chances of extinction (e.g., Soule and Simberloff 1986, Noss *et al.* 1997, Noss *et al.* 1999).

Effects of the Proposed Minimization Measures

The project would maintain approximately 699.3 acres of open space on-site, in four separate preserve areas on the proposed project site; a 132.7 preserve area at the northwest portion of the Fiddyment Ranch portion of the project; a 162.5 preserve area along Pleasant Grove Creek, protecting mostly riparian habitat; a 44.4 acre preserve area along the intermittent unnamed tributary to Pleasant Grove Creek; a 100' corridor along Kaseberg Creek which totals 14.7 acres; and a 345 acre preserve area along the western portion and extending to include numerous swales and un-named channels of the Westpark portion of the proposed development. The four areas support approximately 19.62 acres of wetted vernal pools and 4.76 acres of vernal swales considered habitat for listed crustaceans. These on-site preserve areas would be fragmented from each other and be fragmented and isolated from other vernal pool habitats within the county. This fragmentation and isolation further disrupts and may preclude the long-term viability of the habitat on-site. As a result no reduction in compensation requirements will be granted by establishing these on-site preserve areas. A conservation easement will be recorded on the four preserve areas.

Preservation component. To minimize the loss of 26.66 acres of directly and indirectly affected vernal pools and swales, the applicant is preserving 25.48 acres of wetted vernal pool acres off-site on the Sheridan East parcel in Placer County. An additional 1.2 acres will be preserved at the Yankee Slough parcel in Placer County due to effects associated with the on-site detention basin.

Restoration component. To minimize the loss of 26.66 acres of directly and indirectly affected vernal pools and swales the applicant is restoring a total of 43.0 acres on the southern portion of Yankee Slough parcel in Placer County. The combination of on-site preserves and off-site preserves and restoration will assist in off-setting the loss of vernal pool crustacean habitat on-site and limit the indirect effects of the proposed Westpark/Fiddyment project.

Effects to Vernal Pool Fairy Shrimp Critical Habitat

Issuance of a permit for the proposed Westpark/Fiddyment project will result in loss of approximately 2,436 acres of the designated critical habitat unit 12 for vernal pool fairy shrimp. The loss represents 7.5 percent of the designated critical habitat unit 12 and approximately 0.5 percent of the total critical habitat designated for vernal pool fairy shrimp. The proposed project will preserve on-site approximately 706 gross acres of designated vernal pool fairy shrimp critical habitat. This represents approximately 22 percent of the critical habitat on-site. Since the publication of the proposed critical habitat rule on September 24, 2002 (67 **FR** 59884), and

final critical habitat rule on August 6, 2003 (68 **FR** 46684), we have received additional information regarding occurrences of vernal pool fairy shrimp in the Sheridan area in north western Placer County. The Sheridan area has been found to contain numerous occurrences of vernal pool fairy shrimp and the vernal pool grassland habitats within the Sheridan area has been less subject to development pressure and is less fragmented than habitats near Lincoln, Rocklin and Roseville. The off-site preservation components at Sheridan East and Yankee Slough assist in preserving large parcels of vernal pool habitat in this northwestern portion of Placer County and would off-set the loss of habitat on the proposed Westpark/Fiddyment site.

Cumulative Effects

Cumulative effects are those impacts of future State, Tribal, county, local agency, and private actions that are reasonably certain to occur. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The proposed Westpark/Fiddyment Ranch project site is located in a region where future destruction of vernal pool habitat is anticipated. The Cities of Roseville, Rocklin, and Lincoln and the County of Placer continue to develop Specific and General Plan which do not adequately compensate for the loss of endangered species habitat. Such development will result in increased direct loss of federally listed vernal pool crustacean habitat. It will also contribute to the imperilment of existing vernal pools and seasonal wetlands throughout the area through alterations to local watersheds and disruption of natural flooding regimes.

The Service is currently working with local jurisdictions to establish a more comprehensive vernal pool conservation strategy for the Southeastern Sacramento Vernal Pool Region. These efforts include the Placer County HCP, several city wide planning efforts, and the South Sacramento County HCP. These planning efforts are collectively aimed at establishing a regional preserve system that is configured and managed to provide for the long-term survival of a diversity of special status species including vernal pool crustacean species. However, projects impacting vernal pools continue to move forward prior to the development and adoption of these regional conservation plans, potentially precluding the ability for the regional plans to meet their conservation goals. The loss of the vernal pools on the proposed Westpark/Fiddyment Ranch project area would make it more difficult for vernal pool species to be adequately conserved under regional plans in western Placer County.

Because the vernal pool fairy shrimp and vernal pool tadpole shrimp are endemic to vernal pools in the Central Valley, coast ranges, and a limited number of sites in the transverse range and Santa Rosa plateau of California and southern Oregon, the Service anticipates that a wide range of activities will be determined to affect this species. Such activities include, but are not limited to: (1) urban development, (2) water projects, (3) flood control projects , (4) highway projects, (5) utility projects, (6) chemical contaminants, and, (7) conversion of vernal pools to agricultural use. Projects occurring adjacent to vernal pool complexes will indirectly affect vernal pool complexes and their associated upland areas.

Conclusion

After reviewing the current status of the vernal pool fairy shrimp and vernal pool tadpole shrimp, the environmental baseline for the area covered by this biological opinion, the effects of the proposed action, the effects of the minimization measures, and the cumulative effects, it is the Service's biological opinion that the adverse effects on the vernal pool fairy shrimp and vernal pool tadpole shrimp inhabiting the proposed Westpark/Fiddyment Ranch project site, as proposed, is not likely to jeopardize the continued existence of the vernal pool fairy shrimp and vernal pool tadpole shrimp. As stated above, the proposed project would affect approximately 26.66 wetted acres of vernal pool tadpole shrimp and vernal pool fairy shrimp habitat and 2,436 gross acres of vernal pool critical habitat. Due to the amount of on-site and off-site compensation within the vernal pool ecosystem within Placer County proposed for the project, we have determined that this project, although significant, would not represent an adverse modification of critical habitat for the species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined by the Service as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct. The Service defines "harass" as an intentional or negligent act or omission that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding and sheltering. The Service defines harm to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), take that is incidental to and not intended as part of the agency action is not considered to be prohibited take provided such take complies with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary and must be implemented by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

The Service anticipates that implementation of the proposed action could result in incidental take of listed vernal pool crustaceans. The Service expects that direct take of individuals would be difficult to detect or quantify, because specimens are not easily seen, due to their small body

size. Due to the difficulty in quantifying the number of individuals that will be taken as a result of the proposed action, the Service is quantifying take incidental to the proposed action as the amount of habitat that will become unsuitable for listed vernal pool crustaceans as a result of the action. Therefore, the Service estimates that 17.09 acres of habitat for listed vernal pool crustaceans will be lost through direct habitat loss resulting from the proposed action. An additional 9.57 acres of habitat for listed vernal pool crustaceans will become degraded through indirect habitat loss resulting from the proposed action.

The Service has developed this Incidental Take Statement based on the premise that the reasonable and prudent measures will be implemented. Upon implementation of the following reasonable and prudent measures, incidental take associated with the construction of the proposed action on 17.09 acres of habitat directly affected and 9.57 acres of habitat indirectly affected for listed vernal pool crustaceans will become exempt from the prohibitions described under section 9 of the Act for direct and indirect impacts.

Effect of the Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to the vernal pool fairy shrimp, or vernal pool tadpole shrimp or result in adverse modification of critical habitat for the vernal pool fairy shrimp. Vernal pool tadpole shrimp critical habitat does not occur within the project area so no adverse modification is likely to occur as a result of this project.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to conserve listed vernal pool crustaceans:

1. Minimize the impacts to federally listed vernal pool crustaceans resulting from habitat modification and habitat loss.

2. Vernal pool crustacean habitat will be managed and protected from adverse effects in perpetuity.

3. Minimize direct and indirect effects from project construction to federally listed vernal pool crustaceans.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions. These measures are Terms and Conditions which implement the reasonable and prudent measures described above for the protection of listed vernal pool crustaceans. These terms and conditions are non-discretionary.

1. The following terms and conditions implement reasonable and prudent measure one (1):

   a. The applicant, its assigns, or successor shall obtain 26.68 wetted acres of vernal pool habitat for preservation (as outlined on page 6 above and in the August 7, 2003 letter from the applicant) from a Service-approved area in Placer County for effects to 26.66 acres of vernal pools and vernal pool swales.

   b. The applicant, its assigns, or successor shall restore approximately 43.00 acres of vernal pool and swale habitats for restoration from a Service-approved area in Placer County for effects to 26.66 acres of vernal pools and vernal pool swales. A Service-approved restoration plan shall be developed to restore the approximately 43.00 wetted acres of vernal pool crustacean habitat on the Yankee Slough parcel. The restoration efforts shall be focused on the southwestern portion of the property bordering Brock Road, Nader Road, State Route 65, and Yankee Slough. The plan will provide information on location, size, and density of vernal pool/swales proposed for the site. A post-construction compliance report prepared by the monitoring biologists shall be forwarded to the Sacramento Fish and Wildlife Office within 60 calendar days of the completion of construction activity.

   c. The applicant, its assigns, or successor shall preserve approximately 699.3 acres on-site within four designated preserve areas as outlined above (see page 4 above and Attachment A).

   d. Reasonable access to the preserves shall be allowed with a 24-hour notice by the Service, Corps, or California Department of Fish and Game, and/or other appropriate agencies or Service-approved personnel.

2. The following terms and conditions implement reasonable and prudent measure two (2):

   a. Off-site Preserves: Prior to ground breaking, the applicant, its assigns, or successor shall place a Service-approved conservation easement on the proposed off-site preservation and restoration sites to designate the areas as wetland preserves and for them to be managed in perpetuity as wetland and vernal pool preserves and for the protection of any listed species.

   b. On-site Preserves: Prior to ground breaking on each phase of the project, the applicant, its assigns, or successors shall place a Service-approved conservation easement on the proposed on-site preservation and restoration sites to designate the areas as wetland preserves and for them to be managed in perpetuity as wetland and vernal pool preserves and for the protection of any listed species.

   c. The conservation easements will be recorded with the appropriate county agency and run with the land (See Attachment B Draft Conservation Easement). All such habitat preserved for listed species shall be protected in perpetuity by the conservation

easement. All such vernal pool acres shall be protected from adverse effects and managed in perpetuity or until the Corps and the Service agree on a process to exchange such areas for credits within a Service-approved conservation banking system. The conservation easement shall be reviewed and approved by the Service prior to recording in the appropriate County Recorders Office(s). The conservation easement for off-site preserves shall be recorded within 120 days of the date of the issuance of the permit from the Corps. The conservation easement for the on-site preserves shall be recorded prior to ground breaking of each phase. A true copy of the recorded easement(s) shall be provided to the Service within 30 days after recordation. The easements shall include, but not be limited to, provisions and responsibilities of the permittee(s) for protection of the vernal pool preserves, including any anticipated future transfers of the easement or fee interest. The conservation easements shall specify the purposes for which they were established (i.e., to maintain in perpetuity the suitability of the vernal pool and swale ecosystem and associated watersheds and uplands within the preserves for federally listed vernal pool crustaceans). The easement shall be held by a third party approved by the Service. The documents shall include a list of prohibited activities inconsistent with the maintenance of the preserves and the suitability of the remaining federally listed vernal pool crustacean habitat and associated watershed.

d. The applicant shall transfer the on-site and off-site preserve and restoration areas to a Service-approved third party for perpetual management at the time of recording of the conservation easement.

e. The applicant shall establish a Service approved non-wasting funding mechanism to fully fund the maintenance, management and monitoring of the on-site and off-site preserve and restoration areas. Establishment of the fund may be phased to coincide with the development of the property and establishment of the preserves. The principal in the fund must generate sufficient revenue to cover the costs of activities including but not limited to alien plant species removal, maintenance of fencing, monitoring of vernal pools, and remediation of indirect effects in perpetuity. This endowment shall be made to a Service-approved entity prior to any groundbreaking. Specific actions covered under the endowment shall be addressed in the Management and Monitoring Plan (further described below). All maintenance and management obligations associated with this project at the off-site Sheridan East parcel and the Yankee Slough parcel shall be conducted by the respective owners as agreed through separate agreements by the applicant approved by the Service. The applicant has secured the endowment funds necessary for the maintenance and management of the Sheridan East and Yankee Slough parcels in perpetuity.

f. Prior to groundbreaking, a management and monitoring plan shall be formulated for the on-site and off-site preserve areas. The plan shall be approved by the Service, and shall include but not be limited to the following components: discussions of the management and maintenance in perpetuity of the wetland habitat for the vernal pool fairy shrimp and vernal pool tadpole shrimp within the on-site and off-site preserve

and restoration areas; discussions of runoff control and maintenance of hydrology of the aquatic habitat; provisions for management and maintenance in perpetuity of upland habitat within the on-site and off-site preserve and restoration areas; discussion of grazing strategies, alien species control, sedimentation, erosion, and controlled burning; provisions for creating a position for a preserve manager that would undertake the duties of implementing the management plan; provisions for a monitoring program to be set up and implemented by the preserve manager, with a monitoring report that addresses the ecological functions of the preserve including whether the preserves are adversely affected by adjacent development, and if the maintenance/management plans are successful.

3. The following terms and conditions implement reasonable and prudent measure three (3):

   a. A Worker Environmental Awareness Training Program for construction personnel shall be conducted before and during construction. The program shall provide workers with information on their responsibilities with regard to listed species and an overview of the life-history of the species and description of the preserve areas. Written documentation of the training shall be transmitted to the Sacramento Fish and Wildlife Office within 30 days of completion of training.

   b. Adequate high visibility fencing shall be placed around the on-site preserve areas to prevent encroachment of construction equipment and personnel into wetland preserves during project work activities. Such fencing shall be inspected and maintained daily until completion of the project.

   c. Runoff from dust control, and hazardous materials during construction activities shall be retained in the construction site and prevented from flowing into the on-site wetland preserves or permanent waterways. To control erosion during and after project implementation, the applicant shall implement best management practices, as identified by the appropriate Regional Water Quality Control Board. Erosion control measures and best management practices (BMP's) that prevent soil or sediment from entering the river shall be placed, monitored for effectiveness, and maintained throughout the construction operations. Construction adjacent to the preserve areas (within 250 feet) shall be limited generally to the periods within the dry season (May-September). Construction may occur outside this work window as long soil moisture levels allow access to the areas and the extended forecasts preclude the likelihood of precipitation.

   d. The Service-approved biologist shall have the authority to halt any action that might result in impacts to the preserve areas. If work is stopped due to construction activities within or affecting the preserve areas, the Service shall be notified immediately.

   e. All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 250 feet from any riparian habitat or water body or preserve area. The

applicant shall ensure contamination of habitat does not occur during such operations. All workers shall be informed of the importance of preventing spills and appropriate measures to take should a spill occur.

f. The number of access routes, number and size of staging areas, and the total area of the activity shall be limited to the minimum necessary to achieve the project goal. Routes and boundaries shall be clearly demarcated, and these areas shall be outside of riparian and wetland areas.

g. Stockpiling of construction materials, portable equipment, vehicles and supplies, including chemicals, shall be restricted to the designated construction staging areas and exclusive of the riparian and wetlands avoidance areas. Refueling of construction equipment and vehicles within the floodplain shall occur only within designated areas not affecting the preserves. Any spills of hazardous materials shall be cleaned up immediately. Such spills shall be reported in the post-construction compliance reports.

h. Opportunity shall be given to third party individuals conducting vernal pool restoration efforts to collect innoculum from the vernal pools prior to fill and destruction. At least 90 days notice prior to the beginning of the wet season shall be given to the Service and appropriate wetland restoration contractors (Wildlands, ECORP, etc...). Construction activities shall not begin prior to opportunities to collect innoculum from vernal pools.

i. The Covenants, Conditions and Restrictions for the Westpark/Fiddyment Ranch Project residential development shall at a minimum include a description of the importance of protecting the listed species and habitats preserved at the project site and within the watershed; and a list of prohibited activities that are inconsistent with the maintenance of the suitability of the remaining vernal pool habitat and associated watershed, including, but not limited to: (i) a restriction that no vehicles (including but not limited to passenger vehicles, motorcycles, bicycles, and off-road recreational vehicles) shall be allowed or operated on the preserves by owners, renters, or lessees of any of the lots within the residential development, or by their family members or their guests, (ii) alteration of existing topography or any other alteration or uses for any purposes, including the exploration for, or development of mineral extraction; (iii) placement of any structures on any of the vernal pool preserves, (iv) dumping and/or burning of rubbish, garbage, or any other wastes or fill materials; (v) building of any roads or trails; (vi) killing, removal, alteration, or replacement of any existing native vegetation; (vii) placement of storm water drains or other diversion or alteration of water that would disturb the existing hydrologic characteristics of the preserves and associated watersheds; (viii) fire protection activities not required to protect existing structures; (ix) use of pesticides and herbicides within the preserves; and (x) actions that would degrade the quality of runoff from the project site.

j. Should any phasing of construction occur for the proposed project, those construction activities and disturbances shall not affect vernal pool crustacean habitat on the Westpark/Fiddyment project site.

k. Should the applicant not initiate the first phase of the construction outlined in the project description within 5 years of the date of this biological opinion, or not implement any subsequent phases within 3 years of the completion of any one phase, the terms and conditions of this biological opinion expire and the applicant and the Corps would need to reinitiate consultation regarding the remainder of the proposed project.

l. The applicant shall implement measures to conserve species covered under the Migratory Bird Treaty Act of 1918 as amended. Such measures include but are not limited to bird safe utility poles to reduce the likelihood of electrocution.

m. The applicant shall comply with the reporting requirements outlined below.

Reporting Requirements

The Service's Sacramento Fish and Wildlife Office shall be notified immediately by phone or fax and within three working days in writing of the finding of any dead listed species or any unanticipated harm to the species addressed in this biological opinion. The Service contact person for this is the Chief, Endangered Species Division at (916) 414-6600. The Service-approved biologist shall notify the Service immediately if listed vernal pool crustaceans are found on site and shall submit a report including date(s), location(s), habitat description, and any corrective measures taken to protect the listed species found. The Service-approved biologist shall submit locality information to the California Department of Fish & Game (CDFG), using completed California Native Species Field Survey Forms or their equivalent, no more than 90 calendar days after completing the last field visit of the project site. Each form shall have an accompanying scale map of the site such as a photocopy of a portion of the appropriate 7.5 minute U.S. Geological Survey map and shall provide at least the following information: township, range, and quarter section; name of the 7.5' or 15' quadrangle; dates (day, month, year) of field work; number of individuals and life stage (where appropriate) encountered; and a description of the habitat by community-vegetation type. Global Positioning System coordinates (Universal Transverse Mercator, North American Datum, Zone 10, meters) shall also be provided with any reporting requirements.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases.

1. The Corps should require the applicant to further avoid and minimize wetland and riparian impacts on the project site.

2. As recovery plans for listed crustacean species are developed, the Corps should assist the Service in their implementation.

3. The Corps should work with the Service to ensure that its wetland delineation techniques fully assess the impacts of proposed projects on listed crustacean species.

4. The Corps should conduct a study of cumulative loss of wetlands habitat, including habitat of listed crustaceans in western Placer County.

5. The Corps should incorporate into bidding documents any conservation measures outlined for vernal pools and vernal pool crustaceans when appropriate.

6. The Corps and the applicant should coordinate with the California Department of Fish and Game Officials on implementation of measures to minimize impacts to state listed species.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation with the Corps on the proposed Westpark/Fiddyment Ranch project. As provided for in 50 CFR Section 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law), and if (1) the amount or extent of incidental take is exceeded, as previously described, or the requirements under the Incidental Take section are not implemented; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent that was not considered in this opinion; (3) the proposed action is subsequently modified in a manner that causes an effect to listed species that was not considered in this opinion; and/or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Please contact Arnold Roessler or Elizabeth Warne at (916) 414-6645, if you have any questions.

Sincerely,

Kenneth D. Sanchez
Acting Field Supervisor

cc:
ARD (ES), Portland, Oregon
Environmental Protection Agency, San Francisco, CA (Attn: Ms. Kathy Dadey)
CDFG, Region 2, Rancho Cordova, CA (Attn: Mr. Jeff Finn)
Westpark Associates, Roseville, CA (Attn: Mr. Bill Falik, John Murray)
Signature Properties, (Attn: Mr. Jim McKeehan)
ECORP Roseville, CA (Attn: Jim Stewart)
Hefner, Stark & Marios, Sacramento, CA (Attn: Mr. George Kammerer)

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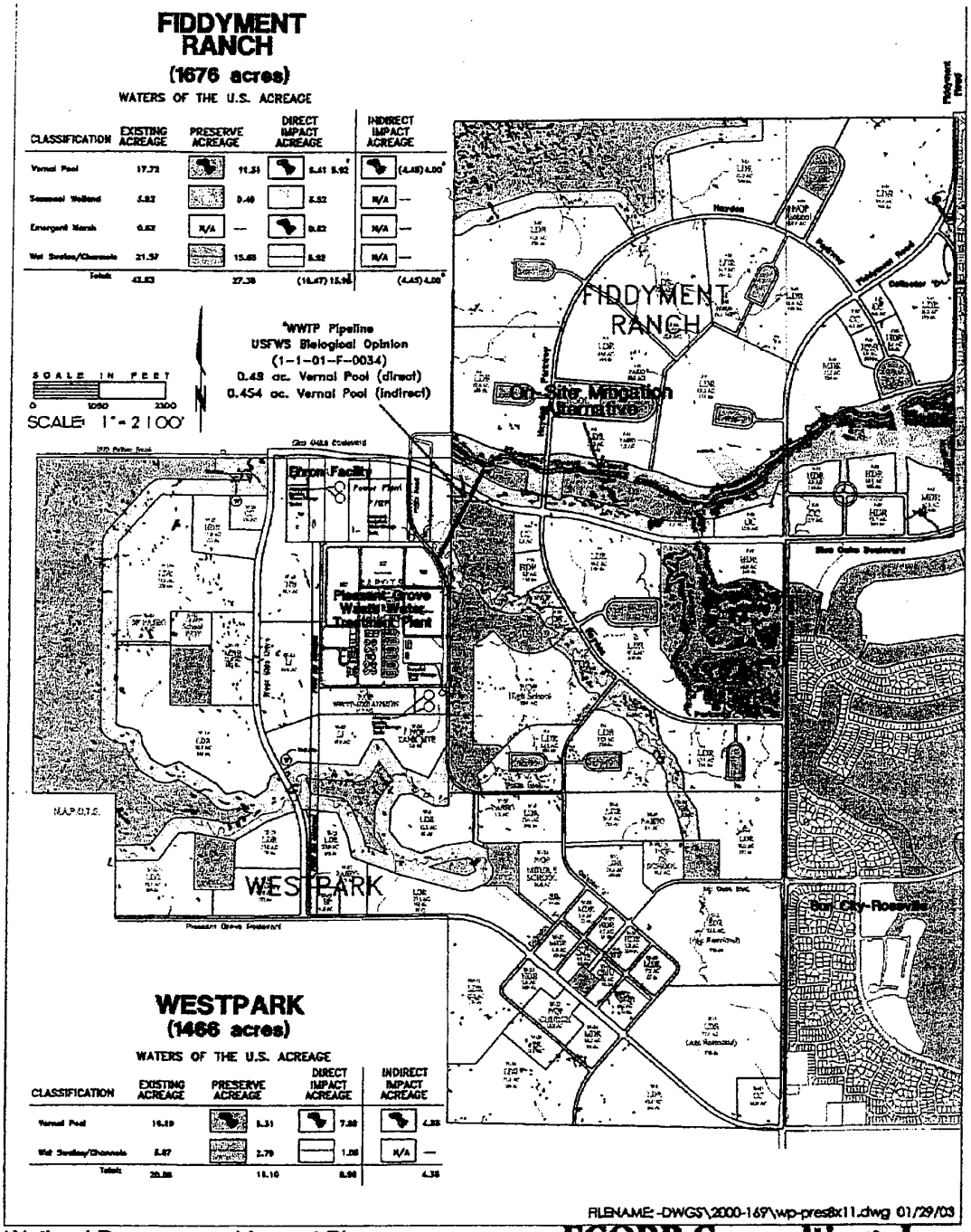
Attachment A: Proposed Westpark/Fiddyment Project



Wetland Preserve and Impact Plan

Westpark/Fiddyment Ranch

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Attachment B: Sample Conservation Easement

RECORDING REQUESTED BY:)
)
)
)
MAIL TO:)
)
)
)
)
)

TEMPLATE

PERPETUAL CONSERVATION EASEMENT GRANT

THIS PERPETUAL CONSERVATION EASEMENT GRANT (this "**EASEMENT**") is made this _____ day of_____, by [name who the grantor is and include applicable category: e.g, a corporation, a partnership, a limited partnership, husband and wife] ("**GRANTOR**"), in favor of the [name of the entity; must be one that is recognized by § 815 of the California Civil Code] ("**GRANTEE**").

RECITALS

A. GRANTOR is [describe Grantor; is it a corporation, a partnership, limited partnership, Federal agency] and is the sole owner in fee simple of certain real property located in the County of [name county(s)], State of California, more particularly depicted on the map attached as Exhibit A hereto (the "**Protected Property**") (this map shows land subject to EASEMENT and separately shows land not subject to EASEMENT. The execution copy of the EASEMENT also shall have legal descriptions attached as Exhibit B); [the map and the legal description must match and portray the actual easement area] and

B. GRANTEE is a non-profit entity formed under the laws of the [State of California, District of Columbia, etc.] and is authorized to hold conservation easements under California Civil Code § 815 et seq.; and

C. SERVICE is the United States Fish and Wildlife Service within the United States Department of the Interior, which is authorized by Federal law to administer the Federal Endangered Species Act and other laws and regulations; and

D. The Protected Property possesses significant ecological and habitat values that benefit endangered, threatened, and other rare species (Collectively, "**Conservation Values**"). These

species and their habitats are of aesthetic, ecological, educational, historical, recreational, and scientific value to the people of California and the people of the United States. These values include [list habitats and plant and animal species; include both listed species, and those that are of special significance], and are of great importance to both GRANTOR and GRANTEE; and

E. Significant portions of the Property, consisting of approximately [##] acres, have been presently identified as being occupied by species of native plants and wildlife which GRANTOR and GRANTEE desire to conserve and protect; [if applicable: restore and/or enhance] [if applicable: pursuant to a Management Plan titled XXXXXXX, a memorandum of which is attached to this EASEMENT as Exhibit C, or record entire Management Plan if possible.]; and

F. GRANTOR intends to convey to GRANTEE the right to conserve and protect [if applicable: restore and/or enhance] the conservation values of the property in perpetuity; and

G. GRANTEE agrees by accepting this grant to honor the intentions of GRANTOR stated herein and to conserve and protect [if applicable: restore and/or enhance] in perpetuity the conservation values of the Protected Property in accordance with the terms of this EASEMENT [if applicable: and the Management Plan prepared for it]; and

H. This EASEMENT provides mitigation for certain impacts located in City of [XXX], County of [XXX], State of California, described in a [date of Biological Opinion/Habitat Conservation Plan] Federal Endangered Species Act [Biological Opinion/Habitat Conservation Plan] for [project name].

Covenants, Terms, Conditions, and Restrictions

In consideration of the above and the mutual covenants, terms, conditions, and restrictions contained herein, and pursuant to the laws of California and California Civil Code section 815 et seq., GRANTOR hereby voluntarily grants and conveys to GRANTEE a perpetual conservation easement over the Protected Property of the nature and character and to the extent hereinafter set forth.

1. PURPOSE

It is the purpose of this EASEMENT to assure that the Protected Property will be retained forever in a natural and open space condition and to prevent any use of the Protected Property that will impair or interfere with the Conservation Values of the Protected Property. GRANTOR intends that this EASEMENT (i) will assure that the Protected Property will be used for such activities as are consistent with the conservation purposes of this EASEMENT, and if applicable: (ii) shall be implemented consistently with the Management Plan.

2. RIGHTS OF GRANTEE

To accomplish the purpose of this EASEMENT, the following rights are conveyed to GRANTEE by this EASEMENT:

(a) To conserve and protect, [if applicable: restore and enhance] the Protected Property.

[if applicable: in a manner consistent with the Management Plan].

(b) To enter upon and traverse all portions of the Property at all times in order to have access to the Protected Property and to monitor GRANTOR's compliance with and otherwise enforce the terms of this EASEMENT [if applicable: and to fulfill duties identified in the Management Plan]; provided that such entry shall not unreasonably impair or interfere with GRANTOR's use and quiet enjoyment of the Property or unreasonably disturb natural resources on the Property; and

(c) To prevent any activity on or use of the Protected Property that is inconsistent with the conservation purposes of this EASEMENT and to require the restoration of such areas or features of the Protected Property that may be damaged by any inconsistent activity or use.

(d) To conserve and protect all mineral, air, water rights, and ground water required to protect and to sustain the biological resources of the Protected Property [describe more specific types of water rights, use of wells, et al.].

3. PROHIBITED USES

Subject to the provisions of Paragraph 4 herein, any activity on or use of the Protected Property inconsistent with the conservation purposes of this EASEMENT is prohibited [if applicable: except as stated in the management plan]. Without limiting the generality of the foregoing, GRANTOR, its personal representative, heirs, assigns, agents, and potential future lessees are expressly prohibited from doing any of the following on Protected Property:

(a) Erecting of any building, billboard, or sign;

2. Grazing (except grazing provided for in the Management Plan) or use of off-road vehicles;

3. Planting, introduction or dispersal of non-native or exotic plant or animal species;

(d) Unseasonal watering, use of herbicides, rodenticides, mosquito abatement activities, or weed abatement activities, incompatible fire protection activities and any and all other uses which may adversely affect the purposes of this EASEMENT;

(e) Depositing of soil, trash, ashes, garbage, waste, bio-solids or any other material;

(f) Excavating, dredging or removing of loam, gravel, soil, rock, sand or other material;

(g) Otherwise altering the general topography of the Protected Property.

(h) Removing, destroying, or cutting of trees, shrubs, or other vegetation, except as required for [list exceptions:
(1) fire breaks, (2) maintenance of existing foot trails or roads, or (3) prevention or treatment of disease, others?]

(i) Granting use of the land to any third party for off-road vehicle use;

(j) Legally subdividing the Conservation Property, recording of a subdivision plan, partition, or any other division of the Conservation Property into two or more parcels;

(k) Paving or otherwise covering of the conservation Property with concrete, asphalt, or any other impervious paving material;

(l) Transferring any appurtenant water right required to maintain and restore the biological resources of the Conservation Property;

(m)Granting surface entry for the exploration or extraction of minerals without approval by the SERVICE; and

(n) [Others? All prohibited actions should be listed-- examples: pumping water, diverting

water, extracting oil, mining].

4. GRANTOR'S DUTIES

_____GRANTOR shall undertake all reasonable actions to prevent the unlawful entry and trespass by persons whose activities may degrade or harm the conservation values of the Protected Property. In addition, GRANTOR shall undertake all necessary actions to perfect GRANTEE's rights under section 2 of this EASEMENT, including, but not limited to, GRANTEE's water rights.

5. RESERVED RIGHTS

GRANTOR reserves to itself, and to its personal representative, heirs, successors, assigns, agents and present and potential future lessees, including, but not limited to, all rights accruing from its ownership of the Property, including the right to engage in or permit or invite others to engage in all uses of the Protected Property that are not expressly prohibited herein and are not inconsistent with the conservation purposes of this EASEMENT.

[Add this paragraph if applicable] This EASEMENT includes Waters consisting of (i) any riparian water rights appurtenant to the Protected Property, (ii) any appropriative water rights held by GRANTOR to the extent those rights are appurtenant to the Protected Property, (iii) any waters, the rights to which are secured under contract between the GRANTOR and any irrigation or water district, to the extent such waters are customarily applied to the Protected Property, and (iv) any water from wells that are in existence or may be constructed in the future on the Protected Property or on those lands described as excepted from the Protected Property in the legal description and that were historically used, by the GRANTOR to maintain the Protected Property in a flooded condition (Collectively, **"Easement Waters"**. The Easement Waters are limited to the amount of GRANTOR's water reasonably required to maintain the Conservation Values of the Protected Property.

6. REMEDIES

If GRANTEE, SERVICE or other interested parties determines that there is a violation of the terms of this EASEMENT or that a violation is threatened, such party shall give written notice to the other parties of such violation and demand corrective action sufficient to cure the violation and, where the violation involved injury to the Property resulting from any use or activity inconsistent with the purpose of this EASEMENT, to restore [if applicable: in accordance with the Management Plan] the portion of the Protected Property so injured. In any instance, measures to cure the violation shall be reviewed and approved by the SERVICE. If a party fails to cure a violation within sixty (60) days after receipt of notice thereof from the other party, or under circumstances where the violation cannot reasonably be cured within a sixty (60) day period, or fails to continue diligently to cure such violation until finally cured, the aggrieved party may bring an action at law or in equity in a court of competent jurisdiction to enforce the terms of this EASEMENT, to enjoin the violation, ex parte as necessary, by temporary or permanent injunction, to recover any damages to which it may be entitled for violation of the terms of this EASEMENT or injury to any conservation values protected by this EASEMENT, including damages for the loss of aesthetic, ecological, educational, historical, recreational or scientific values, and to require the restoration [if applicable: pursuant to the Management Plan]

of the Protected Property to the condition that existed prior to any such injury. If a party, in its good faith and reasonable discretion, determines that circumstances require immediate action to prevent or mitigate significant damage to the Conservation Values of the Protected Property, such party may pursue its remedies under this paragraph without prior notice to the other party or without waiting for the period provided for the cure to expire. Each party's rights under this paragraph apply equally in the event of either actual or threatened violations of the terms of this EASEMENT, and each party agrees that the other party's remedies at law for any violation of the terms of this EASEMENT are inadequate and that such party shall be entitled to the injunctive relief described in this paragraph, both prohibitive and mandatory, in addition to such other relief to which such party may be entitled, including specific performance of the terms of this EASEMENT, without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies. Each party's remedies described in this paragraph shall be cumulative and shall be in addition to all remedies now or hereafter existing at law or in equity. Furthermore, the provisions of California Civil Code section 815 et seq., are incorporated herein by this reference and this EASEMENT is made subject to all of the rights and remedies set forth therein. If at any time in the future GRANTOR or GRANTEE or any subsequent transferee or assignee uses or threatens to use such lands for purposes not in conformance with the provisions of this EASEMENT, or releases or abandons this EASEMENT in whole or in part, notwithstanding California Civil Code § 815 et seq., the California Attorney General, the United States through the SERVICE, or any entities organized for conservation purposes shall have standing as interested parties, and as third party beneficiaries in any proceeding affecting this EASEMENT.

(a) Costs of Enforcement. Reasonable costs incurred by any party enforcing the terms of this EASEMENT, including without limitation, costs of suit and attorneys fees, and any costs of restoration necessitated by a violation of the terms of this EASEMENT shall be borne by the breaching party. If a party prevails in any action to enforce the terms of this EASEMENT, such party's costs of suit including, without limitation, attorneys fees, shall be borne by the other party.

(b) GRANTEE's Discretion. Enforcement of the terms of this EASEMENT shall be at the discretion of GRANTEE, and any forbearance by GRANTEE to exercise its rights under this EASEMENT shall not be deemed or construed to be a waiver by GRANTEE of such term or of any subsequent breach of the same or any other term of this EASEMENT or of any of GRANTEE's rights under this EASEMENT. No delay or omission by GRANTEE in the exercise of any right or remedy upon any breach by GRANTOR shall impair such right or remedy or be construed as a waiver.

(c) Acts Beyond GRANTOR's Control. Nothing contained in this EASEMENT shall be construed to entitle GRANTEE to bring any action against GRANTOR for any injury to or change in the Property resulting from causes beyond GRANTOR's control, including, without limitation, fire, drought, flood, storm, and earth movement caused by an earthquake.

7. COSTS AND LIABILITIES

Except as set forth in this EASEMENT, or as otherwise agreed in writing between the parties hereto, GRANTOR retains all responsibilities related to the ownership, operation, upkeep, and maintenance of the Property.

(a) Taxes: GRANTOR shall pay before delinquency all taxes, assessments, fees, and

charges of whatever description levied on or assessed against the Protected Property by competent authority, including any taxes imposed upon, or incurred as a result of, this EASEMENT, and shall furnish GRANTEE with satisfactory evidence of payment upon request.

(b) Hold Harmless: [this provision varies upon needs of grantee] GRANTOR or its successor shall hold harmless, indemnify, and defend GRANTEE and its members, directors, officers, employees, agents and contractors and the heirs, personal representatives, successors, and assigns of each of them (collectively "Indemnified Parties") from and against all liabilities, penalties, costs, losses, damages, expense, causes of action, claims, demands, or judgments, including without limitation, reasonable attorney's fees, arising from or in any way connected with: (1) injury to or the death of any person, or physical damages to any property, resulting from any act, omission, condition or other matter occurring on the Protected Property, unless caused by the acts or omissions of any of the Indemnified Parties; and (2) the existence or administration of this EASEMENT.

8. ASSIGNMENT

This EASEMENT is transferable, but GRANTEE shall give GRANTOR and the SERVICE [anyone else] at least thirty (30) days prior written notice of the transfer. GRANTEE may assign its rights and obligations under this EASEMENT only to an organization that is 1) approved by the SERVICE [anyone else]; and, 2) a public agency or a qualified organization at the time of transfer under section 170(h) of the Internal Revenue Code of 1954, as amended (or any successor provision then applicable), and the applicable regulations promulgated thereunder; and, 3) authorized to acquire and hold conservation easements under California Civil Code section 815 et seq. (or any successor provision then applicable). As a condition of such assignment or transfer, the Assignee or Transferee shall agree in writing that the conservation purposes that this grant is intended to advance shall continue to be fulfilled [if applicable: and that the Management Plan will be followed] and notice of such restrictions shall be recorded in the county where the property is located. In the event of the termination of GRANTEE's existence, the rights and obligations of GRANTEE hereunder shall, by that fact itself, and without any further action on the part of any entity, be deemed assigned to [Identify Entity; not the SERVICE].

9. SUBSEQUENT TRANSFERS

GRANTOR agrees to incorporate the terms of this EASEMENT in any deed or other legal instrument by which GRANTOR divests itself of any interest in all or a portion of the Property, including, without limitation, a leasehold interest. GRANTOR further agrees to give written notice to GRANTEE and the SERVICE at least fifteen (15) days prior to the date of any property transfer. The failure of GRANTOR to perform any act required by this paragraph shall not impair the validity of this EASEMENT or limit its enforceability in any way.

10. ESTOPPEL CERTIFICATES

Upon request by GRANTOR, GRANTEE shall within fifteen (15) days execute and deliver to GRANTOR any document, including an estoppel certificate, which certifies GRANTOR's compliance with any obligation of GRANTOR contained in this EASEMENT and otherwise evidences the status of this EASEMENT as may be requested by GRANTOR.

11. NOTICES

Any notice, demand, request, consent, approval, or communication that the parties desire or is required to give to the others shall be in writing and either served personally or sent by first class mail, postage prepaid, addressed as follows:

To Grantor:

To Grantee:

To Service:

United States Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846
Attn: Field Supervisor

or to such other address or the attention of such other officer from time to time shall designate by written notice to the other.

12. RECORDATION

GRANTOR shall submit an original, signed and notarized Conservation Easement Grant to GRANTEE and GRANTEE shall promptly record this instrument [if applicable: in accordance with instructions for recordation contained in the biological opinion or HCP] in the official records of [County(s) where property is located], California and may re-record it at any time as may be required to preserve its rights in this EASEMENT.

13. FUNDING

_____GRANTOR has provided [describe funding mechanism for maintenance of easement in perpetuity and include as exhibits all agreements, e.g., declaration of trust] to GRANTEE [others that will be managing the easement] for the purposes of fulfilling all of GRANTOR's obligations long-term operations and maintenance of the EASEMENT [under the Management Plan/Habitat Conservation Plan/Biological Opinion]. Funding shall be transferred to the appropriate transferee or assignee if the EASEMENT is assigned or transferred.

14. ADDITIONAL EASEMENTS

_____GRANTOR shall not grant any additional easements, rights-of-way, or other interests in the Protected Property, other than a fee or leasehold interest, undivided interest or security interest (mortgage or deed of trust), or grant or otherwise transfer to any other person or entity or to other lands or otherwise abandon or relinquish any Waters associated with the Protected Property without the prior written authorization of GRANTEE given through the SERVICE. Such authorization will be given unless the SERVICE, among other things, determines that the proposed interest or transfer will interfere with the use of the Protected Property as habitat suitable for federally listed species or other federally protected species. This paragraph shall not

prohibit the transfer of a fee title or leasehold interest in the Protected Property that is subject to the terms of this EASEMENT. This paragraph shall also not prohibit the granting of future compatible utility easements, as authorized by the SERVICE.

15. GENERAL PROVISIONS

(a) Controlling Law. The interpretation and performance of this EASEMENT shall be governed by the laws of the State of California, the Federal Endangered Species Act, and other applicable Federal laws.

(b) Construction. Any general rule of construction to the contrary notwithstanding, this EASEMENT shall be construed in favor of the grant to effect the Conservation Purpose of this EASEMENT and the policy and purpose of California Civil Code section 815 et seq. If any provision in this instrument is found to be ambiguous, an interpretation consistent with the purposes of this EASEMENT that would render the provision valid shall be favored over any interpretation that would render it invalid.

(c) Severability. If any provision of this EASEMENT, or the application thereof to any person or circumstances, is found to be invalid, the remainder of the provisions of this EASEMENT, or the application of such provision to persons or circumstances other than those as to which it is found to be invalid, as the case may be, shall not be affected thereby.

(d) Entire Agreement. This instrument sets forth the entire agreement of the parties with respect to the EASEMENT and all exhibits and supersedes all prior discussions, negotiations, understandings, or agreements relating to the EASEMENT.

(e) No Forfeiture. Nothing contained herein will result in a forfeiture or reversion of GRANTOR's title in any respect.

(f) Successors. The covenants, terms, conditions, and restrictions of this EASEMENT shall be binding upon, and inure to the benefit of, the parties hereto and their respective personal representatives, heirs, successors, and assigns and shall continue as servitude running in perpetuity with the Property.

(g) Captions. The captions in this EASEMENT have been inserted solely for convenience of reference and are not a part of this EASEMENT and shall have no effect upon construction of interpretation.

(h) Counterparts. The parties may execute this instrument in two or more counterparts, which shall, in the aggregate, be signed by both parties; each counterpart shall be deemed an original instrument as against any party who has signed it. In the event of any disparity between the counterparts produced, the recorded counterpart shall be controlling.

(i) Third-Party Beneficiary: GRANTOR and GRANTEE acknowledge that the SERVICE is a third party beneficiary of this EASEMENT with the right of access to the EASEMENT property and the right to enforce all of the provisions of this EASEMENT.

IN WITNESS WHEREOF, GRANTOR and GRANTEE have entered into this EASEMENT the day and year first above written.

Grantor:_____
Entity

By:_____

Name

_____

Title

Grantee:_____

Entity

By: _____

Name

_____

Title

APPROVED AS TO FORM: [necessary when there are modifications made to the template]

_____

XXXX, Assistant Regional Solicitor
United States Department of the Interior
for U.S. Fish and Wildlife Service

Exhibit A
Conservation Easement Area

Exhibit B
Legal Description of Conservation Easement Area

Exhibit C
Management Plan

Exhibit D
Declaration of Trust

CC Addresses

California Department of Fish and Game
Attn: Jeff Finn
1701 Nimbus Road
Rancho Cordova, CA 95670

Environmental Protection Agency
Attn: Ms. Kathey Dadey
75 Hawthorne Street (WTR-3)
San Francisco, CA 94105

Westpark Associates
Attn: Mr. Bill Falik
2130 Professional Drive, Suite 240
Roseville, CA 95661

Westpark Associates
Attn: Mr. John Murray
2130 Professional Drive, Suite 240
Roseville, CA 95661

Signature Properties
Attn: Mr. Jim McKeehan
4670 Willow Road, Suite 200
Pleasanton, CA 94588

ECORP Inc.
Attn: Jim Stewart
2260 Douglas Blvd, Suite 160
Roseville, CA 95661

Hefner, Stark & Marios, Sacramento, CA
Attn: Mr. George Kammerer
2150 River Plaza Drive, Suite 450
Sacramento, CA 95833

Filename: 03F0013 Westpark_Fiddyment_VP.wpd

ATTACHMENT BIO-2

Status Summary of WRSP Permits

In response to your request for a wetland permitting status for the West Roseville Specific Plan, it is as follows:

federal Endangered Species Act compliance - The US Fish and Wildlife Service (USFWS) assessed unavoidable impacts to potential fairy shrimp habitat (vernal pools) and protected wetland plants and determined that the proposed project did not jeopardize the continued existence of fairy shrimp nor did impacts associated with the project adversely modify critical habitat for the species. An Incidental Take Statement (biological opinion) was issued by USFWS 20 Nov 2003.

US Environmental Protection Agency - ECORP and applicants met with USEPA senior staff to address comments made in response to the Notice of Preparation. The WRSP site plan was modified to include USEPA recommendations.

US Army Corps of Engineers - Public Notice (200200666) The WRSP owners submitted an application to the US Army Corps of Engineers (Corps) (10 July 2002) for a federal Clean Water Act - Section 404 permit. The Corps issued a Public Notice October 01, 2003 and initiated a 30-day comment period. The only comment letter was a letter from USEPA acknowledging the changes to the site plan resulting from the aforementioned meeting and how the concerns raised in the response to the Notice of Preparation had largely been met.

federal Clean Water Act - Section 404 - The US Army Corps of Engineers (Corps)is currently drafting an Individual Permit which addresses the filling of jurisdictional wetlands. A 'Decision Document' has been drafted by Corps staff and as recently as yesterday the Corps has indicated that a draft Section 404 permit will be issued to the applicant by the Sacramento District office by the end of January, 2004. Upon receipt of the Clean Water Act - Section 401 Certificate from the California Regional Water Quality Control Board and after ratification of the EIR and issuance of the Notice of Determination, the final Clean Water Act - Section 404 permit will be issued by the Corps. We anticipate the final 404 permit issued in March 2004.

federal Clean Water Act - Section 401 - The California Regional Water Quality Control Board (CRWQCB) is presently processing the Section 401 Certification. I met with CRWQCB staff last week to present the West Roseville Specific Plan to the board reviewer, and a formal application was submitted this week. We anticipate a CWA - Section 401 Certification in late February / early March, 2004.

California Department of Fish and Game (CDFG) 1603 Streambed Alteration Agreement - As the design of the project becomes more detailed (bridge crossings and creek storm drain outfalls,) the property owners will prepare Streambed Alteration Agreement applications to address possible impacts to state-protected stream and riparian habitat. At present there are only two proposed bridge crossings across Pleasant Grove Creek. The 1603 agreements usually are processed by CDFG staff within 60-days of submittal.

2260 Douglas Blvd.
Suite 160
Roseville, CA 95661
Phone: (916) 782-9100
Fax: (916) 782-9134
Email:ecorp@ecorpconsulting.com
Web: www.ecorpconsulting.com

Regarding endangered species mitigation, the US Fish and Wildlife Service (USFWS) issued an Incidental Take Permit (Biological Opinion) which addressed federally protected species. Within the Biological Opinion, impacts to protected species was assessed and compensatory actions were detailed which mitigate unavoidable impacts. Per the Biological Opinion, the West Roseville Specific Plan is required to restore 43.0 acres of degraded vernal pools at an offsite location within Placer County. The site is Yankee Slough (735 acres) which is within the Coon Creek watershed. The vernal pools will be restored during the summer of 2004. In addition, the USFWS is requiring the preservation of 25.48 acres of vernal pools within the 340 acre East Sheridan wetland mitigation site. The East Sheridan site is also within the Coon Creek watershed and in close proximity to the Yankee Slough restoration site. The US Environmental Protection Agency and California Department of Fish and Game have a special interest in the restoration and preservation of Coon Creek, so the Yankee Slough and East Sheridan sites are important preserves in the regional planning goals of federal, state and local natural resource agencies. A long term monitoring and maintenance plan is being prepared by ECORP and will be implemented upon recordation of conservation easements on the two offsite preserves.

There has been extensive consultation with California Department of Fish and Game (CDFG) regarding State protected species. On 21 January 2004 CDFG issued a letter to the City of Roseville requesting an additional change to text in the FEIR. The City has agreed with the modification and is incorporating the change in the FEIR. With that minor text edit the agency (CDFG) states in the letter "The CDFG believes that the modifications presented in the FEIR reflect those issues raised by the CDFG throughout the planning process." The mitigation plan as proposed, adequately addresses the preservation of state protected species per the CDFG letter. As such there was no requirement for the property owner to obtain an Incidental Take Permit from the state agency.

2260 Douglas Blvd.
Suite 160
Roseville, CA 95661
Phone: (916) 782-9100
Fax: (916) 782-9134
Email ecorp@ecorpconsulting.com
Web: www.ecorpconsulting.com

ATTACHMENT BIO-3

Dry Season Vernal Pool Branchiopod Survey Report

DRY-SEASON SAMPLING
FOR
FEDERALLY LISTED LARGE BRANCHIOPODS
AT THE
ROSEVILLE ENERGY PARK PROJECT, SACRAMENTO COUNTY, CALIFORNIA

Prepared for: TETRA TECH FW, INC.
1940 E. Deere, Suite #200
Santa Ana, CA 92705
Contact: Lenny Malo
(949) 756-7556

Prepared by: HELM BIOLOGICAL CONSULTING
5998 Windbreaker Way
Sacramento, CA 95823
Contact: Brent Helm
(916) 428-7584

December 2003

HELM
Biological Consulting

DRY-SEASON SAMPLING FOR FEDERALLY LISTED LARGE BRANCHIOPODS AT THE ROSEVILLE ENERGY PARK PROJECT, SACRAMENTO COUNTY, CALIFORNIA

INTRODUCTION

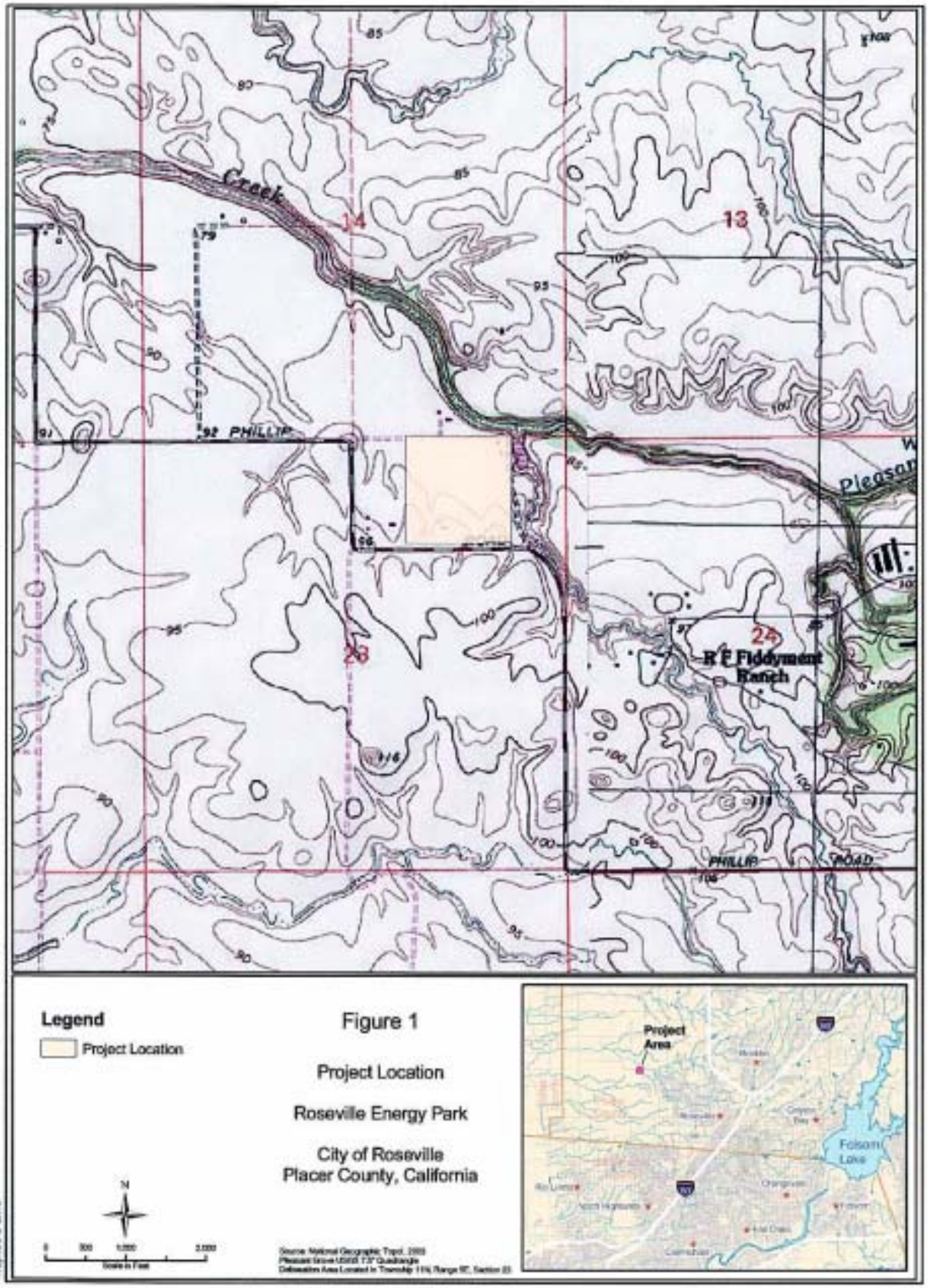
Helm Biological Consulting was contracted by Lenny Malo of Tetra Tech FW Inc. to conduct dry-season sampling for large branchiopods at the Roseville Energy Park Project.

The City of Roseville's electric department, doing business as Roseville Electric, proposes to construct, own, and operate an electrical generating plant in the City of Roseville, Placer County, California. The Roseville Energy Park (REP) will be a natural gas-fired, combined-cycle electrical generating facility rated at a nominal net generating capacity of 119 to 125 megawatts (MW), with the ability to peak-fire to 160 MW. The project site is owned by the City of Roseville and is zoned Public/Quasi-Public. The 40-acre project site is located on City of Roseville property within the limits of the City of Roseville, adjacent to and north of the City's Pleasant Grove Waste Water Treatment Plant (PGWWTP) just north of Phillip Road, and south of the Pleasant Grove Creek (North ½ of northeast ¼ of Section 23, Township 11 North, and Range 5 East Pleasant Grove US. Geological 7.5-minute topographic quadrangle map) (Figure 1).

This report discusses the methods and results of the dry-season sampling for the presence of large branchiopods at the Roseville Energy Park Project.

METHODS

Dr. Brent Helm conducted dry-season sampling on October 3, 2003 under permit TE-795930-2 of Section 10 (a)(1)(A) of the federal Endangered Species Act, 16 U.S.C. 1531 *et seq.*, and its implementing regulations. Methods generally followed U.S. Fish and Wildlife Service (USFWS) *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10 (a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods* (1996) and are described below.


Creek
14
13
PHILLIP
Pleasan
26
24
R E Fiddyment Ranch
PHILLIP
ROAD
Legend
Project Location
Figure 1
Project Location
Roseville Energy Park
City of Roseville
Placer County, California
Project Area
Folsom Lake
N
Source: National Geographic Topo!, 2003
Pleasant Grove USGS 7.5' Quadrangle
Delineation Area Located in Township 11N, Range 6E, Section 23
D:\Projects_2003\roseville_gpw_samples\apps\project_location.mxd Date: Sept 17, 2003
Wayne's Office

All areas that potentially could support federally listed large branchiopods were sampled. Potential habitat for large branchiopods is defined as any seasonal inundated depression that on average ponds water two (2) inches or greater in depth for 30 or more consecutive days. Potential habitat characteristics of large branchiopods are based on the life history of Central Valley endemics (Helm 1998, 1999, Helm and Volmar 2002). The presence of water marks, algae mats, driftlines, hydrophytic ("water-loving") vegetation, slope, contributing watershed, maximum potential ponding depth and aquatic arthropods (i.e., crustaceans and insects) exoskeletons were helpful indicators for evidence of ponding depth and duration. Habitats that flow water (e.g., creeks, streams, ephemeral drainages) or semi-to-permanently inundated areas were not considered suitable habitat for federally listed large branchiopods.

Sampling involved the collection of a minimum of ten soil sub-samples mainly from the lowest topographic areas within each suitable habitat on site. Soil samples were placed in 1-liter size plastic freezer bags and marked with the project name, basin number, and date. The soil was the transported to a laboratory for processing and analysis.

The collected soil material was placed in a large container and filled with water. The soil material was then gently worked by hand to breakdown any persistent soil structure. Table salt (NaCl) was then added to the container to form a brine solution. The organic material rising to the top of the brine solution was skimmed off and placed in a 900-micron pore-size sieve stacked atop a 75-micron diameter pore-size sieve. The soil material was processed through the top sieve by flushing it with lukewarm water while gently rubbing it with a soft-bristle brush. The soil retained from the 75-micron diameter pore size sieve was then removed and thinly spread into plastic petri dishes.

The contents of each petri dish were examined under a 10 to 240-power zoom binocular microscope. A minimum of 0.5-hour was spent searching the contents of each petri dish for large branchiopod cysts. Dr. Helm's large branchiopod cyst reference collection and scanning electron micrographs of cysts (Hill and Shepard 1998, Mura 1991, and Gilchrist 1978) were used to identify and compare cysts within samples.

RESULTS

A total of 32 basins were evaluated for their suitability to support federally listed large branchiopods (Figure 2). Two (P31 and P33) of these 32 basins were considered unsuitable habitat for federally listed large branchiopods because they were permanently


Figure 2
Appendix B
Roseville Energy Park
City of Roseville
Placer County, California
Legend
Soil Sample Location
Waters of the U.S.
Building Footprint
Stormwater Outfall
Sanitary Waste Line
Additional City Property
Project Boundary
Clean Water Act Jurisdictional Wetland
Clean Water Act Non-Jurisdictional Wetland or Swale
Stock Pond
FEMA Flood Zone
N
0 100 200 400
Scale in Feet
Surveyors: Lanny Mako and Eric Hale
September 4, 2003 - Map Version #1

to semi-permanently inundated. The 30 basins that were considered habitat for large brachiopods were dry-sampled. Visual examinations of the soils collected revealed the presence of *Branchinecta* sp. cysts in 11 of the basins (P1, P2, P5, P6, P7, P8, P11, P13, P14, P15 and P18) (Table 1). Representative photographs of the project site are located in Appendix A.

Table 1. Results of Soil Analysis

Basin No.	Large Branchiopod Cysts	Insect Parts	Micro-Turbularian Cysts	Ostracod	Cladoceran Ephippia	Springtails
	Branchinecta Sp.					
P1	32	X	X		X	
P2	23	X	X		X	
P3		X				
P4		X	X			
P5	2	X				
P6	5	X				
P7	7	X			X	
P8	2	X			X	
P9		X			X	
P10		X				
P11	1	X			X	
P12		X	X		X	
P13	4	X	X		X	
P14	11	X	X	X		
P15	6	X			X	
P16		X	X		X	
P17		X			X	
P18	21	X	X	X	X	
P19		X		X		
P20		X				
P21		X				
P22						
P23						
P24		X			X	
P26		X				
P27						
P28		X				
P29		X			X	
P30						X
P31		X			X	

DISCUSSION

Several species within the genus *Branchinecta* are listed as threatened or endangered under the federal Endangered Species Act. Given the morphology of the *Branchinecta* cysts, the location of the project site vicinity, and generally types of habitats in which they were found, the cysts most likely belong to the threatened vernal pool fairy shrimp (*Branchinecta lynchi*). Nonetheless, positive identification of the cysts to species would entail hatching and rearing the cysts to maturity or the collection of mature large branchiopod specimens from the suitable habitat during the wet-season.

LITERATURE CITED

Gilchrist, B. M. 1978. Scanning electron microscope studies of the egg shell in some Anostraca (Crustacea: Branchiopoda). Cell Tiss. Res. 193: 337-351.

Hill, R. E., and W. D. Shepard. 1998. Observation on the identification of California anostracan cysts. Hydrobiologia 359: 113-123.

Mura, G. 1991. SEM morphology of resting eggs in the species of the genus *Branchinecta* from North America. J. Crust. Biol. 11: 432-436.

Helm, B. P. 1999. Feeding ecology of *Linderiella occidentalis* (Dodds) (Crustacea: Anostraca). Doctoral thesis. University of California, Davis. 158 pp.

Helm, B. P. 1998. Biogeography of eight large branchiopods endemic to California. Pages 124-139 *in* Witham, C. W., E. T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff. (eds.). Ecology, conservation, and management of vernal pool ecosystems –proceeding from a 1996 conference. California Native Plant Society, Sacramento, CA. 285 pp.

Helm, B. P., and J. E. Vollmar. 2002. Vernal pool large brachiopods. Pages 151-190 *in* John E. Vollmar (ed.). Wildlife and rare plant ecology of eastern Merced County's vernal pool grasslands. Sentinel Printers, Inc. CA. 446 pp.

APPENDIX A. REPRESENTATIVE PHOTOGRAPHS

Photograph of basin number P1.

Photograph of basin number P2.

Photograph of basin number P3.

Photograph of basin number P4.

Photograph of basin number P5.

Photograph of basin number P6.

Photograph of basin number P7.

Photograph of basin number P8.

Photograph of basin number P9.

Photograph of basin number P10.

Photograph of basin number P11.

Photograph of basin number P12.

Photograph of basin number P13.

Photograph of basin number P14.

Photograph of basin number P15.

Photograph of basin number P16.

Photograph of basin number P17.

Photograph of basin number P18.

Photograph of basin number P20.

Photograph of basin number P21.

Photograph of basin number P22.

Photograph of basin number P23.

Photograph of basin number P24.

Photograph of basin number P26.

Photograph of basin number P27.

Photograph of basin number P28.

Photograph of basin number P29.

Photograph of basin number P30.

Photograph of basin number P31.

ATTACHMENT BIO-4

Vernal Pool Branchiopod Letter and Permit

ATTACHMENT BIO-4

Vernal Pool Branchiopod Letter and Permit

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

3-201
(1/97)

FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

BRENT PAUL HELM
P.O. BOX 1156
WALNUT GROVE, CA 95690
U.S.A.

2. AUTHORITY-STATUTES
16 USC 1539(A)

REGULATIONS *(Attached)*
50 CFR 17.22
50 CFR 17.32

3. NUMBER
TE795930-3 AMENDMENT

4. RENEWABLE
☒ YES
☐ NO

5. MAY COPY
☒ YES
☐ NO

6. EFFECTIVE
10/11/2002

7. EXPIRES
10/10/2006

8. NAME AND TITLE OF PRINCIPAL OFFICER *(If #1 is a business)*

9. TYPE OF PERMIT
THREATENED AND ENDANGERED SPECIES

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED

ON LANDS SPECIFIED WITHIN THE BODY OF THE PERMIT.

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

D. Further conditions of authorization are contained in the attached Special Terms and Conditions.

☒ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS

ANNUAL REPORTS DUE: 01/31.
See permit conditions for further reporting requirements.

ISSUED BY
Sarah B. Hall for

TITLE
CHIEF - ENDANGERED SPECIES

DATE
10/11/2002

Subj: **Request for Dry Season Sampling Sept 29 2003**
Date: 9/30/2003 5:26:17 PM Pacific Standard Time
From: Kenneth_Fuller@fws.gov
To: BHelm69485@aol.com
CC: Elizabeth_Warne@fws.gov

Hi Brent,

By your USFWS Permit # TE-795930-2 and the the Sacramento Fish and Wildlife Office's vernal pool crustacean sampling protocols, you are authorized to conduct dry season sampling in the 31 seasonal wetlands at the Roseville Energy Park facility in Placer County.
Please contact me with any questions.

Ken

Responses to

CEC Staff Data Requests

Data Requests 27-38: Cultural Resources

Application for Certification

for the

Roseville Energy Park

Roseville, California

03-AFC-01

Submitted by

Roseville Electric

February 2004

Technical Area: Cultural Resources (27-38)

Technical report

27 Please provide a technical report documenting an archaeological survey authored by someone who meets the Secretary of Interior's Professional Standards. The report should address the Natural Gas Pipeline Alternative survey covered by Tetra Tech FW Inc. in 2003.

Response: The technical report was previously filed with the CEC in December 2003 under a request for confidentiality as part of the Supplement to the AFC for Data Adequacy. This supplement addressed the natural gas pipeline alternative survey done by Tetra Tech in 2003. It was prepared under the direction of a Registered Professional Archaeologist (Douglas Davy) and therefore meets Secretary of the Interior's professional standards.

Native American response

28 Please provide a summary of any response or lack of response that may have taken place as a result of notification.

Response: There was one written response to the Native American contact program described in the AFC (see attached letter, Attachment CR-1). This was a letter from Greg Baker, Tribal Administrator for the United Auburn Indian Community of the Auburn Rancheria. This letter requested that a qualified archaeologist prepare a report documenting field survey and records search of the project site and requested a copy of the report. A copy of the technical report filed with the CEC has been sent to the tribe in response to this letter.

Native American telephone logs

29 If responses were not received by October 30, 2003, please provide telephone logs of the NAHC requested follow-up telephone calls that provides evidence that the materials were received and evidence of other efforts to further the consultation.

Response: Copies of telephone logs documenting conversations with the Native American contacts from the Native American Heritage Commission's list for Placer County are attached (Attachment CR-1).

Buried prehistoric resources

30 Please thoroughly evaluate the potential for undetected, buried or near surface prehistoric archaeological resources within three miles of the project including linears. Note the proximity of Pleasant Grove Creek to the project, as well as known prehistoric resources such as archeological site CA-PLA-137B.

Response: The potential for buried prehistoric archaeological resources within the REP project vicinity varies according to several key factors. These factors have three key dimensions, however. They are: 1) the density of prehistoric settlement, 2) the characteristics of the erosional-depositional environment, and 3) human-caused disturbances that could either reveal or cover up buried archaeological deposits.

Prehistoric site density—Studies of prehistoric settlement patterns have shown that prehistoric site densities are not uniformly distributed across a given landscape. Long-term settlements are disproportionately located near food, water, and firewood resources and these resources are not uniformly distributed on the landscape. Prehistorically, the local environment consisted of bunchgrass prairie, punctuated by seasonal wetlands during the wet season and crossed by the Pleasant Grove Creek riparian corridor (and other riparian corridors such as that of Dry Creek further south). The area, in general, is transitional between the Sacramento River riparian corridor, with its high prehistoric population density; and the Sierra foothills, with access to a much higher density of oak trees for acorn gathering, pine nuts, and resources of the chaparral vegetation zone, with its higher deer population density. The locations of Native American settlements and early historical records from the beginning of the historic era seem to indicate a very high population density along the Sacramento River and along the riparian corridors of the major tributaries (American, Bear, Cosumnes, Feather rivers), a moderately high population density in the lower Sierran foothills, and a low population density in between these areas. This pattern is documented by the key summaries of early ethnographic information (Kroeber 1925, Wilson and Towne 1979).

This is not to say that the areas in between the Sacramento River and Sierran foothills away from the major rivers were not settled or used, but only that they are less likely to contain a high density of sites or large, residential sites. These areas are more likely to contain work group temporary camps and special food gathering activity sites. These might be located along the smaller riparian corridors (such as along Pleasant Grove Creek) or out in the open plains, but are more likely to occur along the riparian corridors. In general, then, we would expect prehistoric site density in the plains to be low; and in the riparian corridor along Pleasant Grove Creek to be moderately low to moderate.

Erosional-depositional environment—The probability of finding buried prehistoric sites also has to do with the probability of their being buried in the first place. This is controlled by geomorphological processes. Other things being equal, archaeological deposits will slowly be covered and buried. Vegetation continues to build soil humus and ground surfaces not subject to special erosional or depositional forces will slowly rise. Over a period of several hundred years, archaeological deposits once visible on the ground surface will no longer be visible and will be slowly buried to increasing depth.

The forces of erosion and deposition operate differentially, depending on a given site's location. In areas near streams that are subject to overbank flooding, there can be considerable deposition of silts during flood events, leading to the deep burial of even relatively recent sites. In low-lying areas, wind and water erosion can also lead to the movement of soil particles and burial of archaeological deposits due to the colluvial movement of sands and silts. In other areas, particularly elevated places, sites may be subject to wind and water erosion and exposed or eroded away. Sites subject to erosion during a recent part of their life cycle will be likely to be discovered during archaeological survey and recorded and, therefore, will not unexpectedly be encountered during construction as buried sites.

In the project area, the geology near Pleasant Grove Creek is classed as Quaternary alluvium, indicating that these areas have been subject to stream meander and overbank deposition during the past 10,000 years, which is also the period of time applicable to prehistoric Native American settlement. Over this period of time, it is possible that the channels of Pleasant Grove

and Kaseberg creeks changed location and that archaeological sites formerly located on the stream bank are now situated underground and some distance from the stream within this riparian deposition zone. Because of the rapid rates of deposition that are possible in the riparian corridor, sites can be deeply buried, as mentioned above.

Human processes—Human activity can also work to reveal or to cover up archaeological sites. Agricultural activity, such as land clearing and plowing, tends to bring artifacts to the surface (for sites buried within the plow zone), where it is more likely that archaeological surveyors will find them and record them. Overgrazing can also cause erosion and reveal sites that are not deeply buried. Land leveling activities can cover surface sites. In the project area, residential and street development has covered the ground surface along a large portion of the natural gas transmission line (Alternative A). Archaeological survey was conducted prior to these developments, however, and trenching for utility placement provided the opportunity for buried archaeological sites to be discovered in these areas. Along other portions of the natural gas pipeline routes, there has been very little human activity involving ground disturbance (such as plowing or land leveling), so it is more likely that buried sites, if they are located there, may not have been found. Most of these areas are grazing land that have sustained little in the way of direct land disturbance.

Looking at all three factors, we can generalize that the potential for finding buried prehistoric sites in the project vicinity is moderate to moderately low. The predicted prehistoric site density is low for areas along the natural gas pipeline that are not located near Pleasant Grove or Kaseberg Creek. Predicted site density is moderate for the project site, since it is relatively near Pleasant Grove Creek. Also near the project site and along natural gas pipeline alternative A, the predicted level of soil deposition is moderate to moderately high. The chances of site exposure or burial due to human activity are low generally near the project site. In general, the highest sensitivity for buried archaeological sites would be in the Pleasant Grove Creek / Kaseberg Creek corridors, along pipeline route A where the route turns west from Fiddyment Road along the new alignment of Blue Oak Boulevard and at the power plant site itself. In these areas, the potential for finding buried prehistoric archaeological deposits could be rated as moderate with a moderately high rating where the route crosses Kaseberg Creek.

Historic ranches

31 *Please provide a discussion of the historical importance of the Fiddyment Ranch and other historic ranches within three miles of the project site as it pertains to the development of agriculture and ranching in the area.*

Response: The archaeological survey report conducted for the West Roseville Specific Plan (WRSP) area (PAR 2001:7-9 and DPR 523 forms) includes a detailed overview of the development of agriculture and ranching in the project area, as well as archaeological site records of several sites associated with the Fiddyment family's ranching enterprises. Interestingly, all of the historic era resources recorded in the WRSP area except one are associated with members of the Fiddyment family. The lone exception to this is a 1930s era homestead site that is located near gas pipeline alternative C. A brief outline of the Fiddyment family's history in the project area is as follows.

Elizabeth Fiddyment met and married George Hill in the Elk Grove area, and moved to the project area, known as the Pleasant Grove district, in 1856. She received a parcel of land as

payment of a debt, and by the time of her death in 1912, Elizabeth's holdings had grown to 13,000 acres, in southern Placer County.

Elizabeth's son, Walter, purchased land in the Pleasant Grove District in 1879, and began construction of the complex of buildings known as the Fiddyment Ranch. Walter Fiddyment found farming, and raising horses and mules unprofitable, and so turned to raising cattle and sheep. The ranch complex expanded in the 1880s, with the enlargement of the house and addition of several buildings. When Walter stopped farming in 1918, his son, Russell, began raising turkeys on the ranch. Turkey and cattle and sheep ranching continued by Russell, his brother, sisters, and their husband, and later by a fourth generation. Turkey and sheep ranching continued until the 1990s. Today, the ranch is used for cattle grazing. Several members of the Fiddyment family still reside on the ranch property. With their experimentation with farming, sheep, cattle, chicken, and turkey ranching, the Fiddyment family represented all of the local trends in area ranching throughout the historic era.

Buried historic resources

32 *Please thoroughly evaluate the potential for undetected, buried or near-surface historic archaeological resources within one mile of the project, including linears.*

Response: Undetected or buried historic archaeological features are most likely to occur in the vicinity of older ranches or farms in the project vicinity. Privies, trash dumps, and other features likely to remain undiscovered and also having the potential to yield artifacts and other materials of possible archaeological or historic value are likely to be located near centers of historic activity, particularly residences. It is unlikely, though possible, that rural residences of the historic era are located in or near the project facilities that have not been detected through the several archival research programs and pedestrian archaeological projects that have covered the project site, project linears and the adjacent areas. Large trash dumps and abandoned privy locations are known to occur in and around the main Fiddyment Ranch house and building complex (PAR 2001). This area is not located near any of the REP project features, however.

The most likely place for an encounter with buried or previously undetected historical resources is along natural gas pipeline Alternative A (the preferred alternative) at the northern end of Fiddyment Road, where Fiddyment Road crosses Kaseberg Creek and where the pipeline route will turn east along the future extension of Blue Oak Boulevard. The possible site of the historic-era Pleasant Grove School is located in the vicinity of the Kaseberg Creek crossing, and a marked, historic-era grave site is also located nearby. This portion of the project area was covered historically in oak woodland and may have been attractive to settlers seeking shelter and firewood for this reason. Another area of moderate to high sensitivity for resources of the historic era is where Alternative A turns east from Fiddyment Road. This is a part of the Fiddyment Ranch that was used as a turkey brooding area during the 1970s but older structures are located nearby and this may have been an area of early historic activity on the Fiddyment Ranch.

Fiddyment Ranch

33 *Please provide a discussion of the change in integrity of the setting, feeling and association of the Fiddyment homestead and main ranch complex completed by an individual that meets the Secretary of Interior's Professional Standards for this resource type. Since the Fiddyment property is adjacent*

to the proposed project site, discuss whether the change in the setting, feeling and association would materially impair the eligibility of the resource to the CRHR.

Response: The alternative 60 kV wood pole transmission line would run north-south along Phillip Road, approximately 1,000 feet west of the Fiddyment Ranch main building complex, and would then run east-west along Phillip Road to Fiddyment Road. The complex is approximately 2,450 feet north of the east-west portion of Phillip Road and the ranch's access road connects with this portion of Phillip Road. The ranch buildings are visible traveling north along Phillip Road, but only along a short stretch of the road. Elsewhere, trees and hillocks block the view. The ranch buildings are not visible from the east-west portion of Phillip Road. At this distance, the wooden transmission poles of the 60 kV transmission line would appear in the middle-ground to background from the ranch buildings and barnyard in areas where they could be seen at all, marking the location of the roadway, as the existing distribution lines do. During much of the period of significance (1879-1949), rural electrical lines and telephone lines were a normal and expected part of the cultural landscape. As such, they would have little or no adverse effect on the integrity of feeling and association of the Fiddyment Ranch.

Local historical societies

34 *Please contact local historical and archaeological societies that might have knowledge of historical or archaeological resources within one mile of the project. Please provide copies of the inquiry letters and any responses.*

Response: Contacts with the Roseville Historical Society and Placer County Historical Society did not result in the identification of archaeological or historical resources known to these organizations within a mile of the project (see copies of correspondence at the end of this section, Attachment CR-2).

Site record

35 *If any such resources are identified that could be impacted by the project or could have their immediate surroundings altered (change in the integrity of the setting) by this project in such a manner that the significance of the historical resource would be materially impaired and it has not been recorded on a Department of Parks and Recreation (DPR) 523 form, then please record the cultural resources on the DPR 523 form and provide a copy of the form.*

Response: No such resources were identified.

Resource significance

36 *If any of the resources could be impacted by the project or could have their immediate surroundings altered (change in the integrity of setting) by this project in such a manner that the significance of the historical resource would be materially impaired, please provide a discussion of the significance of the resources under CEQA Section 15064.5(a), (3), (A)(B)(C) and (D) and provide staff with a copy of the assessment and the specialist's conclusions regarding the significance.*

Response: No such resources would be impacted.

Resource significance

37 *Please provide copies of local lists of important cultural or historic resources within one mile of the project site and linears that are designated by a local ordinance by the City of Roseville and by Placer County.*

Response: The City of Roseville has not designated specific historic or cultural resources by local ordinance (Mark Morse, City of Roseville Planning Department, personal communication, 2003). Placer County has recently adopted such a list, but thus far, only one historic property has been listed, the Lincoln Highway, which is not located within one mile of the project site (Carmel Barry-Schweyer, Curator of Archives, Placer County Department of Museums, personal communication, 2003).

Site record and significance evaluation

38 *If any of these resources could be impacted by the project or could have their immediate surroundings altered (change in the integrity of setting) by this project in such a manner that the significance of the historical resource would be materially impaired, then please provide the following:*

Response: No resources were identified.

References Cited

Kroeber, A.L. 1925. Handbook of the Indians of California. Bureau of American Ethnology Bulletin 78. Smithsonian Institution, Washington, DC. (Dover Publications unabridged reprint, 1976, New York).

PAR Environmental Services. 2001. Cultural resources investigation of the Westpark / Fiddyment Ranch and Liveoak Enterprises / Signature Property Development Project, Placer County, California. Prepared by PAR Environmental Services. Prepared for Signature Properties, Orangevale, California.

Wilson, N. and A. Towne. 1979. Nisenan. In Handbook of North American Indians, Volume 8, California. Smithsonian Institution, Washington, D.C.

ATTACHMENT CR-1

Native American Consultation

MIWOK MAIDU United Auburn Indian Community of the Auburn Rancheria

JESSICA TAVARES CHAIRPERSON | DAVID KEYSER VICE CHAIR | CHRISTINE BEALL SECRETARY | DOLLY SUEHEAD TREASURER | MONA CAMP COUNCIL MEMBER

November 24, 2003

Jenna Farrell
Tetra Tech
3947 Lennane Drive, Suite 200
Sacramento, California 95834

Subject: Impact to Cultural Resources on Project Site

Dear Ms. Farrell,

We recently received a notification indicating that Roseville Electric is proposing a project (Roseville Energy Park) that has the potential to impact Native American cultural sites. As you may know, under the California Environmental Quality Act and Section 106 of the National Historic Preservation Act, Roseville Electric is required to consult with Indian tribes that may have cultural affiliations or interest in your project. The United Auburn Indian Community is composed of Miwok and Maidu Indians with an ancestral territory encompassing Placer and Nevada Counties, and surrounding areas. We are concerned about projects that may impact our ancient burial grounds and village sites, and sites that have cultural and religious importance to us.

We request that a qualified archaeologist prepare a report documenting a field survey and records search of your project site before the project is approved. We would like to receive a copy of the report upon its completion. We will then review the report and determine if cultural resources of importance to us may be impacted.

Please contact our environmental consultant, Dr. Shelley McGinnis, of Analytical Environmental Services, at (916) 447-3479 if you have any questions regarding this matter.

Sincerely,

Greg Baker
Tribal Administrator

CH2MHILL TELEPHONE CONVERSATION RECORD

Call To: Jeff Murray
Cultural Resources Manager
Shingle Springs Band of Miwok Indians

Phone No.: 530-676-8010 **Date:** January 21, 2004

Call From: Anar Bhimani

Subject: Confirming letter and attachment dated October 16, 2003 was received

Letter dated October 16 including attachment was received by Delisa L. Nelson on January 28, 2004 confirmed by signature on registered delivery.

CH2MHILL TELEPHONE CONVERSATION RECORD

Call To: Jessica Tavares, Chairperson
United Auburn Indian Community of the Auburn

Phone No.: 916-663-3720 **Date:** February 2, 2004

Call From: Anar Bhimani

Subject: Confirming letter and attachment dated October 16, 2003 was received

Confirmed letter and attachment was delivered to the office and was received by Shelly McGinnis.

CH2MHILL TELEPHONE CONVERSATION RECORD

Call To: John Suehead, Chairperson
United Auburn Indian Community of the Auburn

Phone No.: 916-663-3720 **Date:** February 2, 2004

Call From: Anar Bhimani

Subject: Confirming letter and attachment dated October 16, 2003 was received

Confirmed letter and attachment was delivered to the office and was received by Shelly McGinnis.

CH2MHILL TELEPHONE CONVERSATION RECORD

Call To: Rose Enos

Phone No.: 530-878-2378 **Date:** February 2, 2004

Call From: Anar Bhimani

Subject: Confirming letter and attachment dated October 16, 2003 was received

Confirmed letter and attachment was received by Ms. Enos.

CH2MHILL TELEPHONE CONVERSATION RECORD

Call To: Christopher Suehead,
Cultural Representative
Todd Valley Miwok-Maidu Cultural Foundation

Phone No.: 530-367-3893 **Date:** January 21, 2004

Call From: Anar Bhimani **Time:** 10:47 AM

Message Taken By: Answering machine

Subject: Confirming letter and attachment dated October 16, 2003 was received

Called Mr. Suehead January 21, 2004 and again on several time unable to reach him have left him several messages inquiring confirmation on receiving letter and attachment dated October 16, 2003. Have not yet received a confirmation from Mr. Suehead as of February 5, 2004.

ATTACHMENT CR-2

Correspondence with Historical Societies

Davy, Doug/SAC

From: dean moore [carnegie@surewest.net]
Sent: January 26, 2004 3:49 PM
To: Davy, Doug/SAC
Subject: Re: Roseville Energy Park and historic resources

In checking with our resident historian---- He could not think of anything inthis site. Dean Moore Curator

Doug.Davy@ch2m.com wrote:

> January 26, 2004
>
> Roseville Historical Society
> Carnegie Museum, Roseville
> 557 Lincoln Street
> Roseville, California 95678
>
> To Whom it May Concern:
>
> I am a cultural resources management specialist working as a consultant on behalf of the City of Roseville to assist the City in the preparation of an Application for Certification (AFC) for the Roseville Energy Park (REP) project. REP is a 120 MW, natural gas-fired power plant that will be located immediately north of the new Pleasant Grove Waste Water Treatment Plant on Phillip Road, approximately 1.25 miles east of the present Roseville City limit (I've attached a map showing the locations of the power plant and natural gas pipelines). The AFC is submitted to the California Energy Commission, which conducts an environmental review of the project under the Warren-Alquist Act (equivalent to the California Environmental Quality Act for power plants).
>
> We would be very interested in hearing from you regarding any significant historic sites located in the vicinity of the project site or natural gas pipeline routes and that we may not be listed in the California Office of Historic Preservation's California Historic Resources Information System. We are aware of the Fiddyment Ranch (located about 0.5 mile southeast of the REP project site); CA-PLA-730 (possibly the site of the old Pleasant Grove School); and the early grave site located within the Sun City development east of Fiddyment Road. Are there other historic sites in the project area of interest to the Placer County Historical Society that are located near the REP project site?
>
> Your assistance in this matter is much appreciated.
>
> Sincerely,
>
> Douglas M. Davy, Ph.D.
> Cultural Resources Scientist
> CH2M Hill
> 2485 Natomas Park Drive, Suite 600
> Sacramento, CA 95833
> (916) 286-0278
> (916) 614-3473 (fax)
> ddavy@ch2m.com

Davy, Doug/SAC

From: Davy, Doug/SAC
Sent: January 26, 2004 3:10 PM
To: 'pchs@placercountyhistoricalsociety.org'
Subject: Roseville Energy Park

To whom it may concern:

I am a cultural resources management specialist working as a consultant on behalf of the City of Roseville to assist them in the preparation of an Application for Certification (AFC) for the Roseville Energy Park (REP) project. REP is a 120 MW, natural gas-fired power plant that will be located immediately north of the new Pleasant Grove Waste Water Treatment Plant on Phillip Road, approximately 1.25 miles east of the present Roseville City limit (I've attached a map showing the locations of the power plant and natural gas pipelines). The AFC is submitted to the California Energy Commission, which conducts an environmental review of the project under the Warren-Alquist Act (equivalent to the California Environmental Quality Act for power plants).

We would be very interested in hearing from you regarding any significant historic sites located in the vicinity of the project site or natural gas pipeline routes and that we may not be listed in the California Office of Historic Preservation's California Historic Resources Information System. We are aware of the Fiddyment Ranch (located about 0.5 mile southeast of the REP project site); CA-PLA-730 (possibly the site of the old Pleasant Grove School); and the early grave site located within the Sun City development east of Fiddyment Road. Are there other historic sites in the project area of interest to the Placer County Historical Society that are located near the REP project site?

Your assistance in this matter is much appreciated.

Sincerely,

Douglas M. Davy, Ph.D.
Cultural Resources Scientist
CH2M Hill
2485 Natomas Park Drive, Suite 600
Sacramento, CA 95833
(916) 286-0278
(916) 614-3473 (fax)
ddavy@ch2m.com

Responses to

CEC Staff Data Requests

Data Requests 39: Efficiency

Application for Certification

for the

Roseville Energy Park

Roseville, California

03-AFC-01

Submitted by

Roseville Electric

February 2004

Technical Area: Efficiency (39)

Natural gas supply

39 Please provide documentation from PG&E confirming its ability and readiness to supply adequate quantities of natural gas to the REP for the life of the project.

Response: Attached is a copy of a letter from PG&E documenting their ability and readiness to supply adequate quantities of natural gas to the REP (Attachment EF-1).

ATTACHMENT EF-1

PG&E Letter

Pacific Gas and Electric Company

77 Beale Street
San Francisco, CA 94105
Mailing Address
Mail Code B16A
P.O. Box 770000
San Francisco, CA 94177
415/973-7000

Via Mail and Fax

October 14, 2003

Mr. Russ Nichols
City of Roseville/Roseville Electric
2090 Hilltop Circle
Roseville, CA 95747

Subject: Preliminary Application for Gas Service, City of Roseville, Roseville Energy Park

Dear Mr. Nichols:

On August 7, 2003, Pacific Gas & Electric Company (PG&E) provided to the City of Roseville (Applicant) a System Impact Study as a partial response to Applicant's Preliminary Application for Gas Service for a proposed Roseville Energy Park project (Facility) to be located near 38° 37.54 N 121° 22.90 W off of Phillip Road, City of Roseville, Placer County, California. Applicant subsequently requested PG&E to provide a Preliminary Facilities Study to include order-of-magnitude costs. PG&E now provides the information requested by Applicant. This review is based upon a request for gas service on January 9, 2005, for a gas load of 1500 MMBTU/Hr year round at an elevated service delivery pressure of 675 psig.

Prior to providing you with this information, PG&E would like to notify you that due to the significant reinforcement costs when compared to the projected revenue, PG&E may request this gas service connection to done under a negotiated agreement, to be submitted by PG&E to the CPUC under PG&E's Gas Rule 15, Section H.3., Exceptional Cases provision.

PG&E views this project as speculative, and any changes to Applicant's proposed volumetric needs, or to the demand on PG&E's system, could result in modifications to information PG&E provides herein. At no time does PG&E guarantee pressures above that which is specified in Gas Rule 2 (7-inches water column). The pressures provided herein are based on computer models, which contain various assumptions and uncertainties, and therefore represent our best estimate of expected pressures. In order to confirm the minimum elevated delivery service pressure available, PG&E will need to complete its investment plan for meeting core load growth in the Sacramento Valley Region and confirm the pressure available to the City of Roseville under future Cold Winter Day (CWD) Conditions. This work is expected to be complete in the forth quarter of 2003.

For All Routes:

Standard Facilities:

PG&E based this study upon the routes provided to PG&E in Mr. Russ Nichols' email to Mr. George Karkazis on October 7, 2003. The Standard Facilities design for each route requires 10-inch steel pipeline reinforcement and extension from PG&E's Line 123, located near Baseline Road and Oak Avenue, to the meter set located at the Facility. PG&E has not identified a preferred route. At such time as PG&E does identify the preferred route, if Applicant requests an alternative route and if PG&E agrees to do so, the incremental costs, if any, will be treated as Special Facilities and subject to the conditions and costs as described in PG&E's Gas Rule 2. In each case PG&E has considered the extension as 1.4 miles of 10-inch steel pipeline from its nearest Distribution main (Fiddyment and Blue Oaks Road) to the Facility.

PG&E estimates that a Standard Facilities Design would provide a minimum floating gas transmission service pressure downstream of the meter set from between 100 to 150 psig, and a maximum floating pressure between 400 to 500 psig depending upon local operating and load conditions. Regulated service would be at a lower pressure due to pressure drop across the pressure control equipment.

Special Facilities:

By increasing the size of the steel pipeline from 10 to 12-inch, PG&E estimates that a Special Facilities Design would provide an elevated minimum floating gas transmission service pressure downstream of the meter set from between 150 to 200 psig, and a maximum floating pressure from between 400 to 500 psig.

By increasing the size of the steel pipeline from 10 to 16-inch, PG&E estimates that a Special Facilities Design would provide an elevated minimum floating gas transmission service pressure downstream of the meter set from between 175 to 225 psig, and a maximum floating pressure from between 400 to 500 psig.

Be advised that the maximum pressure for both Standard and Special Facilities Design for all load conditions is dependent on local operating and load condition. Future pressures may be higher, depending on the reinforcement requirements to serve future load growth in the area, but would likely not exceed 975 psig.

Costs:

PG&E's estimated Applicant order-of-magnitude cost, plus-or-minus 50 percent follows.

Route A:

Total Estimated Applicant Cost for Standard Facilities Design at Prevailing Service Delivery Pressure	Costs +/- 50%
1. Install ~1.4 miles10-inch steel pipe extension from existing pipeline system to meter set	$1,286,000
2. Land	$37,000
3. Install 10-inch ultrasonic meter	$350,000
4. Sub Total:	$1,673,000
5. Income Tax Contribution of Construction (22% of 4.)	$368,000
6. Total Applicant Standard Facility Design Cost	$2,041,000

Total Estimated Applicant Cost for Special Facilities Design at Elevated Service Delivery Pressure	Costs +/- 50%
1. Incremental cost for 5.71 miles of 12" steel pipeline	$811,000
2. Income Tax Contribution of Construction (22% of 1.)	$178,000
3. Cost of Ownership – Customer-Financed Equivalent One-Time Payment Option	$623,000
4. Total Applicant Special Facilities Design Cost	$1,612,000
5. Total Applicant Cost – Standard plus Special Facilities Design	$3,653,000

Total Estimated Applicant Cost for Special Facilities Design at Elevated Service Delivery Pressure	Costs +/- 50%
1. Incremental cost for 5.71 miles of 16" steel pipeline	$3,011,000
2. Income Tax Contribution of Construction (22% of 1.)	$662,000
3. Cost of Ownership – Customer-Financed Equivalent One-Time Payment Option	$2,312,000
4. Total Applicant Special Facilities Design Cost	$5,985,000
5. Total Applicant Cost – Standard plus Special Facilities Design	$8,026,000

Route B

Total Estimated Applicant Cost for Standard Facilities Design at Prevailing Service Delivery Pressure	Costs +/- 50%
1. Install ~1.4 miles10-inch steel pipe extension from existing pipeline system to meter set	$1,286,000
2. Land	$37,000
3. Install 10-inch ultrasonic meter	$350,000
4. Sub Total:	$1,673,000
5. Income Tax Contribution of Construction (22% of 4.)	$368,000
6. Total Applicant Standard Facility Design Cost	$2,041,000

Total Estimated Applicant Cost for Special Facilities Design at Elevated Service Delivery Pressure	Costs +/- 50%
1. Incremental cost for 5.56 miles of 12" steel pipeline	$794,000
2. Income Tax Contribution of Construction (22% of 1.)	$175,000
3. Cost of Ownership – Customer-Financed Equivalent One-Time Payment Option	$610,000
4. Total Applicant Special Facilities Design Cost	$1,578,000
5. Total Applicant Cost – Standard plus Special Facilities Design	$3,619,000

Total Estimated Applicant Cost for Special Facilities Design at Elevated Service Delivery Pressure	Costs +/- 50%
1. Incremental cost for 5.56 miles of 16" steel pipeline	$2,952,000
2. Income Tax Contribution of Construction (22% of 1.)	$649,000
3. Cost of Ownership – Customer-Financed Equivalent One-Time Payment Option	$2,267,000
4. Total Applicant Special Facilities Design Cost	$5,868,000
5. Total Applicant Cost – Standard plus Special Facilities Design	$7,909,000

Route B1

Total Estimated Applicant Cost for Standard Facilities Design at Prevailing Service Delivery Pressure	Costs +/- 50%
1. Install ~1.4 miles10-inch steel pipe extension from existing pipeline system to meter set	$1,286,000
2. Land	$37,000
3. Install 10-inch ultrasonic meter	$350,000
4. Sub Total:	$1,673,000
5. Income Tax Contribution of Construction (22% of 4.)	$368,000
6. Total Applicant Standard Facility Design Cost	$2,041,000

Total Estimated Applicant Cost for Special Facilities Design at Elevated Service Delivery Pressure	Costs +/- 50%
1. Incremental cost for 5.72 miles of 12" steel pipeline	$898,000
2. Income Tax Contribution of Construction (22% of 1.)	$198,000
3. Cost of Ownership – Customer-Financed Equivalent One-Time Payment Option	$690,000
4. Total Applicant Special Facilities Design Cost	$1,786,000
5. Total Applicant Cost – Standard plus Special Facilities Design	$3,827,000

Total Estimated Applicant Cost for Special Facilities Design at Elevated Service Delivery Pressure	Costs +/- 50%
1. Incremental cost for 5.72 miles of 16" steel pipeline	$3,390,000
2. Income Tax Contribution of Construction (22% of 1.)	$746,000
3. Cost of Ownership – Customer-Financed Equivalent One-Time Payment Option	$2,604,000
4. Total Applicant Special Facilities Design Cost	$6,740,000
5. Total Applicant Cost – Standard plus Special Facilities Design	$8,781,000

Route C

Total Estimated Applicant Cost for Standard Facilities Design at Prevailing Service Delivery Pressure	Costs +/- 50%
1. Install ~1.4 miles10-inch steel pipe extension from existing pipeline system to meter set	$1,286,000
2. Land	$37,000
3. Install 10-inch ultrasonic meter	$350,000
4. Sub Total:	$1,673,000
5. Income Tax Contribution of Construction (22% of 4.)	$368,000
6. Total Applicant Standard Facility Design Cost	$2,041,000

Total Estimated Applicant Cost for Special Facilities Design at Elevated Service Delivery Pressure	Costs +/- 50%
1. Incremental cost for 6.52 miles of 12" steel pipeline	$896,000
2. Income Tax Contribution of Construction (22% of 1.)	$197,000
3. Cost of Ownership – Customer-Financed Equivalent One-Time Payment Option	$688,000
4. Total Applicant Special Facilities Design Cost	$1,781,000
5. Total Applicant Cost – Standard plus Special Facilities Design	$3,822,000

Total Estimated Applicant Cost for Special Facilities Design at Elevated Service Delivery Pressure	Costs +/- 50%
1. Incremental cost for 6.52 miles of 16" steel pipeline	$3,309,000
2. Income Tax Contribution of Construction (22% of 1.)	$728,000
3. Cost of Ownership – Customer-Financed Equivalent One-Time Payment Option	$2,541,000
4. Total Applicant Special Facilities Design Cost	$6,578,000
5. Total Applicant Cost – Standard plus Special Facilities Design	$8,619,000

For both Special Facilities and Standard Facilities, Applicant would be responsible for installing its service line from the meter set to the Facility, and for providing communications (i.e., telephone service) at the meter set.

Costs do not include allowances, if any. Special Facilities costs and service will be in accordance with PG&E Gas Rule 2. Additionally, the identified ITCC rate of 22% is a temporary figure, only in effect through December 2004. In 2005, the rate will revert to the previous figure of 35%.

Should you have any questions about this information, please call me at 415-973-2908 or Mike O'Brien at 415-973-5652.

Sincerely,

Rodney A. Boschee
Manager, Contract Development and Management

Responses to

CEC Staff Data Requests

Data Request 40: Hazardous Materials Handling

Application for Certification

for the

Roseville Energy Park

Roseville, California

03-AFC-01

Submitted by

Roseville Electric

February 2004

Technical Area: Hazardous Materials Handling (40)

Off-site consequences analysis

40 Please provide off-site consequence modeling results for a worst-case and an alternative-case loss-of-containment incident for aqueous ammonia. These should include exposure assessment for the worst-case upset condition that shows expected maximum downwind distance to concentrations listed in the AFC protocol, plus the LC10 (2000 ppm for 60 minutes), and IDLH (300 ppm for 30 minutes) concentrations under F-class stability conditions. Results should include details of any mitigation (e.g., secondary containment catchment basin, double-walled tank, etc.) for the storage tank, ammonia delivery-truck unloading pad, and the ammonia-transfer pumping package that are assumed in the OCA modeling.

Response: REP will store a 28 percent aqueous ammonia solution in a single stationary storage tank. The capacity of the tank will be 10,000 gallons. The tank will be surrounded by a secondary containment structure capable of holding the full contents of the tank plus accumulated rainwater. The total exposed surface area of the containment system will be approximately 825 square feet (55 feet by 15 feet).

Aqueous ammonia will be delivered to the plant by truck transport. The containment area for the storage tank will be constructed slightly below grade and the truck loading area will be located adjacent to the storage tank and will be sloped and drain into the bermed containment area.

OCA Analysis Methodology—An analysis of a tank failure and subsequent release of aqueous ammonia was prepared. The analysis assumes the complete failure of the tank and the formation of an evaporating pool of aqueous ammonia within the secondary containment structure. For purposes of this analysis, the following meteorological data were used:

- U.S. Environmental Protection Agency (USEPA) default (worst case) meteorological data, supplemented by daily temperature data as required by CCR Title 19, Section 2750.2.

REP will be located in the Placer County, California. The maximum temperature recorded near the project site in the past 10 years was 111 ^{o}F or 317.04 Kelvin (Western U.S. Climate Historical Summaries http://www.wrcc.dri.edu/climsum.html). Maximum temperatures combined with low wind speeds and stable atmospheric conditions are expected to result in the highest modeled ammonia concentrations at the furthest distance downwind of the project site.

Table DR40-1 displays the meteorological data values used in the modeling analysis.

One modeling run was conducted, an evaporating pool release caused by a single tank failure, for the corresponding meteorological scenario listed in Table DR40-1. Modeling was conducted using the SLAB numerical dispersion model. A complete description of the SLAB model is available in *User's Manual for SLAB: An Atmospheric Dispersion Model for Denser-Than-Air-Releases, D. E. Ermak, Lawrence Livermore National Laboratory, June 1990*. The SLAB user manual contains a substance database, which includes chemical specific data for ammonia. This data was used in all modeling runs without exception or modification.

Table DR40-1. Meteorological input parameters for the off-site consequence analysis.

Parameter	Worst Case Meteorological Data
Wind Speed	1.5 meters/second
Stability Class	F
Relative Humidity	50 percent
Ambient Temperature	317.04 Kelvin (111 ^{o}F)

Emissions of aqueous ammonia were calculated pursuant to the guidance given in *RMP Offsite Consequence Analysis Guidance, EPA, April 1999* and using the "evaporation calculator" provided on-line at the National Oceanic and Atmospheric Administration's internet site (http://response.restoration.noaa.gov/cameo/evapcalc/evap.html#). Release rates for ammonia vapor from an evaporating 28 percent solution of aqueous ammonia were calculated assuming that the mass transfer of ammonia across the liquid surface occurs according to principles of heat transfer by natural convection. The release rate was calculated using the evaporation calculator, meteorological data displayed in Table DR40-1 and the dimensions of the secondary containment area.

An initial evaporation rate was calculated and assumed to be sustained for at least one hour. For concentrated solutions, the initial evaporation rate is substantially higher than the rate averaged over time periods of a few minutes or more since the concentration of the solution immediately begins to decrease as evaporation begins.

For the main storage tank scenario, the complete release of the storage tank contents (8,500 gallons of 28% aqueous ammonia) was assumed to be the worst-case scenario. The failure of the tank would cause the aqueous ammonia to leak into the containment area and release of ammonia would result from evaporation.

Although the edge of the tank containment area is raised above ground level, the release heights used in the modeling were set at 0 m above ground level (AGL) to maintain the conservative nature of the analysis. Downwind concentrations of ammonia were calculated at a height of 1.6 meters above ground level and at 0 meters above ground. Reported distances to specified toxic endpoints are the maximum distances for concentrations at 0 meters above ground or 1.6 meters above ground. The California Office of Environmental Health Hazard Assessment (OEHHA) has designated 1.6 meters as the breathing zone height for individuals.

An analysis of an alternative release scenario such as a tank loading hose failure and the subsequent impacts was also considered. This analysis would normally be completed under typical or average meteorological conditions for the area. However, after review of the possible failure modes, it was determined that the impact of this type of release would be significantly less than the impact posed by a complete tank failure and resulting ammonia spill, since the area of evaporative loss would be considerably less than with a complete failure of the tank. Therefore, only predicted impacts from a release scenario of the complete failure of the storage tank are presented below.

Toxic Effects of Ammonia—Four offsite "bench mark" exposure levels are typically evaluated for potential impacts associated with an accidental release of ammonia. These are: 1) the lowest concentration posing a risk of lethality, 2000 ppm for 60 minutes; 2) the Occupational Safety and Health Administration's (OSHA) Immediately Dangerous to Life and Health (IDLH) level of 300 ppm for 30 minutes; 3) the Emergency Response Planning Guideline (ERPG) level of 200 ppm for 60 minutes, which

is also the RMP level 1 criterion used by the USEPA and California (in the year 2000 the American Industrial Hygiene Association (AIHA) updated the ERPG-2 for ammonia to 150 ppm); and 4) the level considered by CEC staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm for 60 minutes.

The odor threshold of ammonia is about 5 ppm, and minor irritation of the nose and throat will occur at 30 to 50 ppm. Concentrations greater than 140 ppm will cause detectable effects on lung function even for short-term exposures (0.5 to 2 hours). At higher concentrations of 700 to 1,700 ppm, ammonia gas will cause severe effects; death occurs at concentrations of 2,500 to 7,000 ppm.

The specified toxic endpoint (TE) value for ammonia is 0.14 mg/l, which is approximately equal to 200 ppm (*RMP Offsite Consequence Analysis Guidance, EPA, April 1999*). The TE value is based on a one-hour exposure or averaging time; therefore, the modeled concentrations at all offsite receptors will be listed in terms of one-hour (or 60-minute) averaging time with the exception of the modeled concentrations for the OSHA IDLH which is expressed as a 30-minute average.

Modeling Results—Table DR40-2 shows the distance to the lowest concentration posing a risk of lethality, (2000 ppm), OSHA's IDLH (300 ppm), the EPA/CalARP toxic endpoint (200 ppm) and the CEC significance value (75 ppm) for the modeled release scenario. The distance to the nearest plant boundary from the center of the ammonia storage tank is 155 feet or 47.24 meters, which is greater than distance to any of the toxic endpoints. The model results thus show that any offsite ammonia concentrations resulting from a catastrophic tank failure would be lower than the most conservative concentration levels and would therefore not pose a significant risk to any offsite receptors.

Table DR40-2. Distances to EPA/CalARP and CEC toxic endpoints.

Scenario	Distance to 2000 ppm (m)	Distance to IDHL of 300 ppm (m)	Distance to EPA/CalARP TE of 200 ppm (m)	Distance to CEC Significance Value, 75 ppm (m)
0 m AGL	23.60	27.33	27.94	29.74
1.6 m AGL	27.73	32.17	32.75	33.49

The model input file and the output files are available upon request.

Numerous conservative assumptions were used in the above analysis of the tank failure. These include the following:

Modeling & Meteorology

- Worse case of a constant mass flow, initial evaporation rate was modeled, whereas in reality the evaporation rate would decrease with time as the concentration in the solution decreases.
- Worst case stability class was used, which almost exclusively occurs during nighttime hours, but the maximum ambient temperature of 111°F was used, which would occur during daylight hours.
- Again worst-case meteorology corresponds to nighttime hours, whereas the worst-case release of a tank failure would most likely occur during daytime activities at the power plant. At night, activity at a power plant is typically minimal.

Risk probability—Accidental releases of aqueous ammonia in industrial use situations are rare. Statistics compiled on the normalized accident rates for RMP chemicals for the years 1994-1999 from *Chemical Accident Risks in U.S. Industry-A Preliminary Analysis of Accident Risk Data from U.S. Hazardous Chemical Facilities, J.C. Belke, Sept 2000*, indicates that ammonia (all forms) averages 0.017 accidental releases per process per year, and 0.018 accidental releases per million pounds stored per year. Data derived from *The Center for Chemical Process Safety, 1989*, indicates the accidental release scenarios and probabilities for ammonia in general shown in Table DR40-3.

Table DR40-3. General accidental release scenarios and probabilities for ammonia.

Accident Scenario	Failure Probability
Onsite Truck Release	0.0000022
Loading Line Failure	0.005
Storage Tank Failure	0. 000095
Process Line Failure	0.00053
Evaporator Failure	0.00015

Conclusions—Several factors need to be considered when determining the potential risk from the use and storage of hazardous materials. These factors include population densities near the project site, meteorological conditions, and the process design. Considering the results of this analysis, the probability of a catastrophic storage tank failure and the resulting modeled off-site ammonia concentrations, and the probability of a tank failure occurring under low wind speeds and F class atmospheric stability, the risk posed to the local community from the storage of aqueous ammonia at the REP site is minimal.

As described above, numerous conservative assumptions have been made at each step in the analysis. This compounding of conservative assumptions has resulted in a significant overestimation of the probability of an ammonia release at the REP and the predicted distances to toxic endpoints do not pose a threat to nearby receptors. Therefore, the risk from exposure to aqueous ammonia due to the REP is less than significant.

Responses to

CEC Staff Data Requests

Data Requests 41-47: Land Use

Application for Certification

for the

Roseville Energy Park

Roseville, California

03-AFC-01

Submitted by

Roseville Electric

February 2004

Technical Area: Land Use (41-47)

Planned school locations

41 The school proposals noted above are part of the development plans for the Signature Properties/Westpark Associates residential communities. To assess potential land use impacts, please provide any information as to recent discussions with the CDE and/or the Roseville area school districts associated with the placement of CDE-identified potentially hazardous facilities (e.g., natural gas line, on-site hazardous materials), within close proximity of the proposed schools.

Response: The Applicant contacted Mr. Michael O'Neill, of the School Facilities Planning Division of the California Department of Education (CDE) and discussed the school siting review process at the CDE. Mr. O'Neill explained that school districts must conduct a CEQA-level analysis and review of all prospective school sites before building a new school. New school sites must meet certain standards of health and safety in accordance with various state laws and guidelines in order to qualify for state funding. These guidelines trigger additional reviews or risk assessments if certain conditions are met. These conditions include location within one quarter-mile of a source of hazardous air emissions or a place where hazardous materials are stored or used, and location within 1500 feet of a high-pressure pipeline.

Discussions with the CDE centered around the school sites that were chosen for the West Roseville Specific Plan. The REP site, with natural gas Alternative A (preferred alternative), would be consistent with the state school siting guidelines.

City review and comment

42 Please discuss when Roseville Electric intends to submit the project to the appropriate reviewing entity (City Council, Planning Commission, or Design Review Committee), and whether the resulting City recommendations will be available so staff may consider them in either the Preliminary or Final Staff Assessments.

Response: The REP project is not subject to securing any discretionary permits from the City (i.e. no use permit or design review permit) and will therefore not be reviewed by the Planning Commission or Design Review Committee. This is consistent with the processing or other City projects (e.g. parks) and not unique to the REP. The City will develop conditions of approval for the project as it would in the normal City project process review, and submit them to the CEC staff in March 2004. The project will ultimately be presented to the City Council for approval and authorization to proceed, but not until after the CEC has certified the project.

Parcel merger schedule

43 Please provide Roseville Electric's proposed schedule and the status of the application request before the City for the merger of parcels request to create one legal parcel.

Response: The parcel merger will take place prior to construction.

Legal description

44 Please provide the legal description for the newly created parcel and revised parcel map.

Response: The Applicant will provide this information once the parcel merger is complete.

Zoning code standards

45 Revise Figure 2.2-1 Site Layout Map in the application to provide the:

Response: Because of its scale, AFC Figure 2.2-1 is not the appropriate figure upon which to show information such as the north property line, the future extension of Blue Oaks Boulevard, and the future re-routed Phillip Road. These features would all fall outside the figure boundary. In response to this request, the Applicant has provided a revised version of AFC Figure 2.2-2 as Attachment LU-1 (Figure DR45-1).

a) location of all existing exterior lot lines with distances to existing and proposed structures;

Response: Figure DR45-1 shows seven parcels, all of which are presently owned by the City of Roseville. The REP will be constructed on three of these parcels. The outer limits of these three parcels are identified as "EXISTING EXTERIOR PROPERTY LINE" and distances from each property line to the closest project structures are shown. Any existing structures on the project property are temporary structures associated with the construction of the Pleasant Grove Waste Water Treatment Plant. These structures will have been removed prior to construction of the REP

b) location of the centerlines of Phillip Road, and Blue Oak Boulevard with distances to existing, exterior property lines;

Response: The centerlines of the future re-rerouted Philip Road and the future extension of Blue Oaks Boulevard are now both shown on Figure DR45-1, along with the distances from the project property lines. In both cases, portions of the roads will be located on the project property, but well away from the project structures.

c) location of existing and proposed curbs and gutters with distances to exterior property lines; and

Response: Figure DR45-1 shows the dimensions from the centerline of road to the back-of-curb for both the future re-rerouted Philip Road as well as the future extension of Blue Oaks Boulevard. The distances from the back-of-curb to the project property lines can be calculated from this information along with that contained in response to item (b).

d) locations with distances for any areas of building setback that will be landscaped.

Response: While there will be landscaping associated with the construction of the future re-rerouted Philip Road and the future extension of Blue Oaks Boulevard, no landscaping is proposed for the REP. Figure 12-8 of the West Roseville Specific Plan Design Guidelines (included in Attachment LU-2) shows the landscape requirements for the future re-routed Phillip Road, east of the REP. Figure 12-2 of the West Roseville Specific Plan Design Guidelines (included in Attachment LU-2) shows the landscape requirements for the future extension of Blue Oaks Boulevard, north of the REP.

Zoning code standards

46 Provide details on the project's sign program that includes:

a) the location, size and number of all signs proposed;

b) the materials that will be used to construct the signs;

c) the lighting technique that will be used for the signs;

d) the height of all proposed signs;

e) the type of signs to be used (e.g., a monument sign or a building mounted sign);

f) if signs will be located on buildings identify the distance from the surface of the sign to the surface of the structure to which it will be attached;

g) architectural renderings of all signs proposed; and

h) the content of each proposed sign.

Response: Signage is a design element that is scheduled for completion during the project's final design stages. The Applicant will fully comply with the City of Roseville's sign ordinances and the WRSP design guidelines for signage when conducting the final design for the signs.

Lot coverage standard

47 Provide calculations to show the project's consistency with the City of Roseville's Public/Quasi-Public District lot coverage standards with respect to:

a) the areal extent of the project site (i.e., the entire extent of the ultimate legal parcel proposed for development) in square feet; and

b) the areal extent of proposed and existing structures with roofs, in square feet.

Response: The areal extent of the project site is 409,600 square feet for the power plant site, plus an additional 48,000 square feet for the switchyard. The areal extent of the roofed structures will be approximately as follows:

Administration / Control building	6,050
Warehouse / Maintenance Building	6,050
Water Treatment Building	1,650
Electrical Building	4,400
Total	18,150 sf

The ratio of roofed area to developed area is thus 0.04.

ATTACHMENT LU-1

Figure DR45-1

Revised Figure 2.2-2

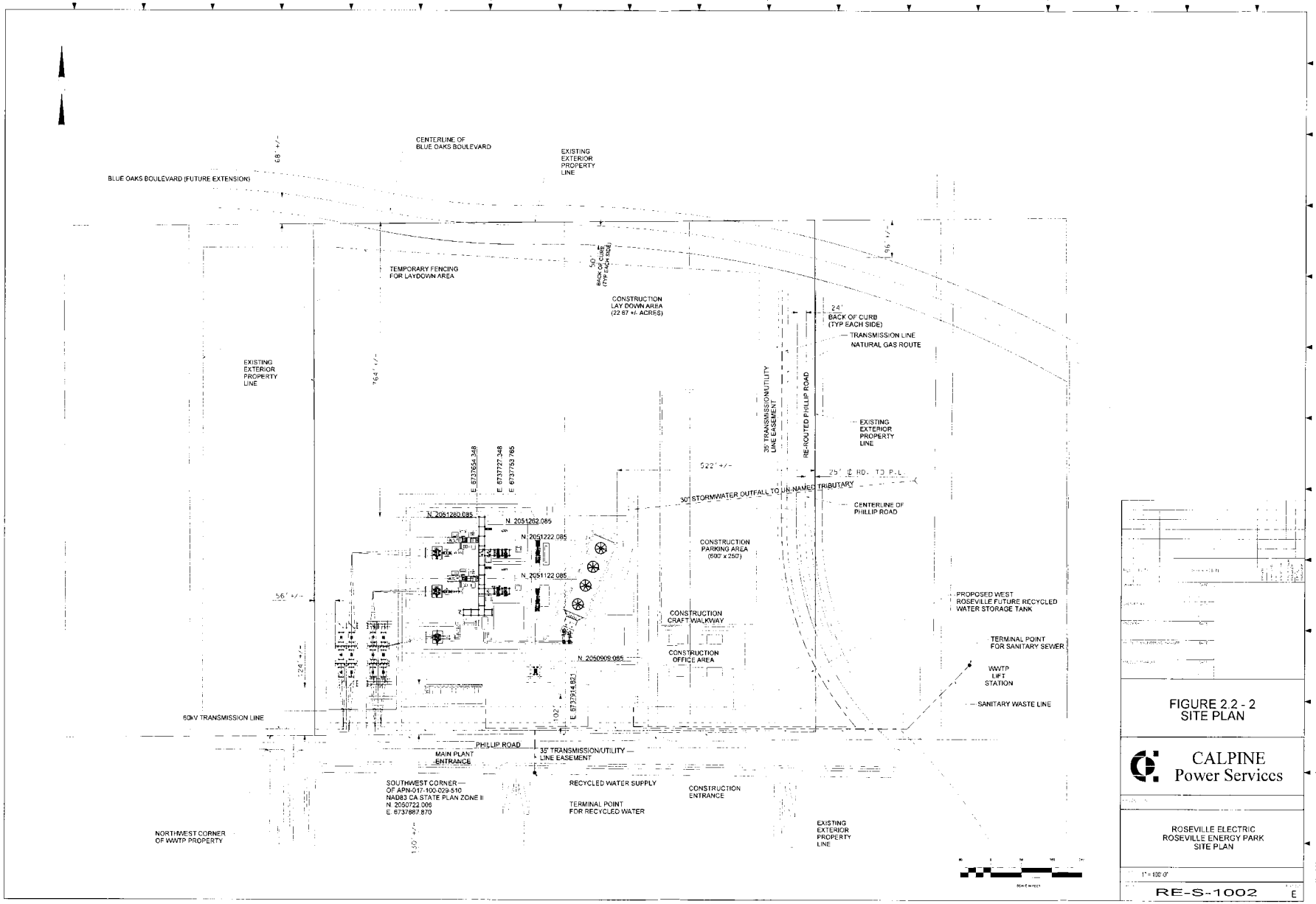


FIGURE 2.2 - 2
SITE PLAN

CALPINE
Power Services

ROSEVILLE ELECTRIC
ROSEVILLE ENERGY PARK
SITE PLAN

1" = 100'-0"

RE-S-1002 E

ATTACHMENT LU-2

WRSP Design Guidelines

Draft

WEST ROSEVILLE SPECIFIC PLAN

Prepared for:

CITY OF ROSEVILLE
TRADITION • PRIDE • PROGRESS

Prepared by:

EIP ASSOCIATES

September 15, 2003

- Blue Oaks Boulevard (Figure 7-2) is planned for 6-lanes (100-foot right-of-way) extending west through the WRSP terminating at West Side Drive. A 60kV overhead power line is planned within a 35- to 50-foot wide easement coterminous with the landscape corridor on the north side of Blue Oaks Boulevard. The landscape treatment within this easement differs dependent upon whether the adjacent use is open space or another use (see Design Guidelines, Section 12). Early phases of the WRSP will construct 4-lanes of Blue Oaks Boulevard with a 38-foot wide median that may accommodate expansion to 6-lanes in the future. A striping and turning movement plan for the Fiddyment Road/Blue Oaks Boulevard intersection area is included on Figure 7-3, with a median opening plan for all WRSP roadways with landscaped medians included on Figure 7-10. The intent of the turning movement and median opening plans are to identify opportunities to consolidate left turn movements to facilitate traffic flow and minimize interruption to the median.

- West Side Drive (Figure 7-4) is planned as 6-lanes (100-foot right-of-way) extending between Blue Oaks and Pleasant Grove Boulevards. The landscape treatment for West Side Drive differs when adjacent to a Paseo versus other uses (see Design Guidelines, Section 12). Early phases of the WRSP will construct 4-lanes of West Side Drive with a wide median that may accommodate expansion to 6-lanes in the future.

- Pleasant Grove Boulevard (Figure 7-5) is planned for 4-lanes (76-foot right-of-way) with a landscaped median extending from Fiddyment Road to West Side Drive. Pleasant Grove Boulevard will continue west beyond West Side Drive as a 2-lane collector to serve adjacent residential neighborhoods.

- Fiddyment Road (Figure 7-5 and 7-6) is planned to be expanded to 4-lanes (76-foot right-of-way) with a landscaped median and will be realigned to improve flow and safety north of the Blue Oaks Blvd. intersection. Portions of the old Fiddyment Road will be utilized as local roadways. Other portions, including the bridge over Pleasant Grove Creek, will be utilized as bike and pedestrian trails. A section of Fiddyment Road just north of its intersection with Pleasant Grove Boulevard expands to 6-lanes with 120-feet of right of way (see Figures 7-1 and 7-6)

The Placer County General Plan includes a general alignment for a northern extension of Watt Avenue near the western edge of the WRSP. Given that the WRSP represents the western limit of development in the City of Roseville, and that an extension of Watt Avenue is not needed to serve the Plan Area, this roadway has not been included in the WRSP. West Side Drive could be utilized as the alignment of Watt Avenue if necessary in the future.

Details relating to the construction and phasing of WRSP arterial roadways is included in the project development agreements.

☐ Collector Roadways

Collector streets are secondary circulation routes that generally distribute trips from the arterial street system to the local street system. On street parking on WRSP collectors is prohibited, and access to adjacent uses may be restricted dependent upon projected traffic volumes or to minimize breaks in landscape medians where present. Collector streets contain 2-lanes, Class II bike lanes, and adjacent 25-foot wide landscape corridors incorporating 5-foot detached sidewalks. Right-of-way for a typical collector is 48-feet (see Figure 7-7).

Within the WRSP, there are two unique collector configurations:

- Hayden Parkway (Figure 7-8) provides 50-feet of right-of-way to accommodate a 12-foot wide landscape median with restricted median breaks (see Figure 7-10). A detailed median opening plan for Hayden Parkway adjacent to the fire station site is included as Figure 8-1, Public Services Plan (Section 8).

- Phillip Road is a typical collector street with a 20- to 25-foot wide landscape corridor on the west and south side of the street with landscape screening and barrier requirements adjacent to the PGWWTP (see Design Guidelines, Section 12). There are three variations to the landscape treatments and road section for Phillip Road as reflected on Figure 7-9.

As previously noted, a median opening plan for all WRSP roadways with landscaped medians is included on Figure 7-10. The intent of this figure is to show in advance all left turn movements approved within the project. The goal is to minimize interruption to the landscape median in an effort to maximize landscaping and to facilitate efficient traffic flow. Additional detail is included in Section 12.2.1.7 of the Design Guidelines.

☐ Local Roadways

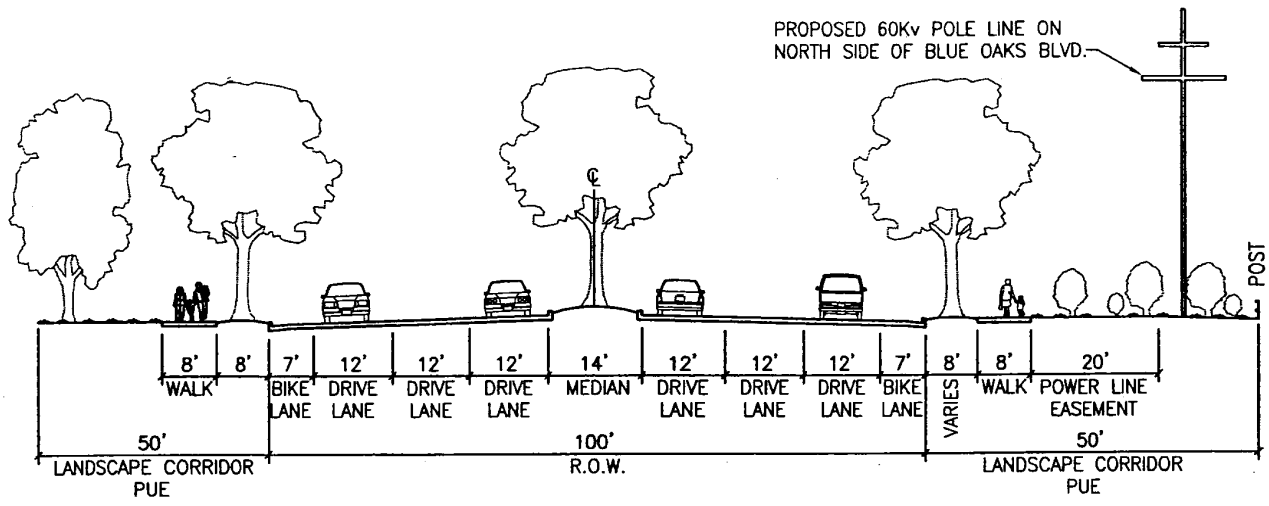
Local streets provide direct access to abutting land uses and connections to collector streets. Local streets are 2-lanes, include on-street parking and adjacent 4-foot wide sidewalks. Provisions are included for both detached and attached sidewalks. The WRSP encourages the use of detached sidewalks and includes modified residential development standards to promote their use (see Land Use Plan, Section 4). In addition, the WRSP requires the use of single loaded roadways adjacent to paseo and open space areas, and the inclusion of entry elements at intersections with collector or arterial roadways. See Design Guidelines, for additional details.

- Primary Residential Streets (Figure 7-11) are used to accommodate higher traffic volumes and where Class III bike lanes are desired. Primary Residential Streets include two travel lanes with 46 to 56-feet of right-of-way.

Figure 7-2

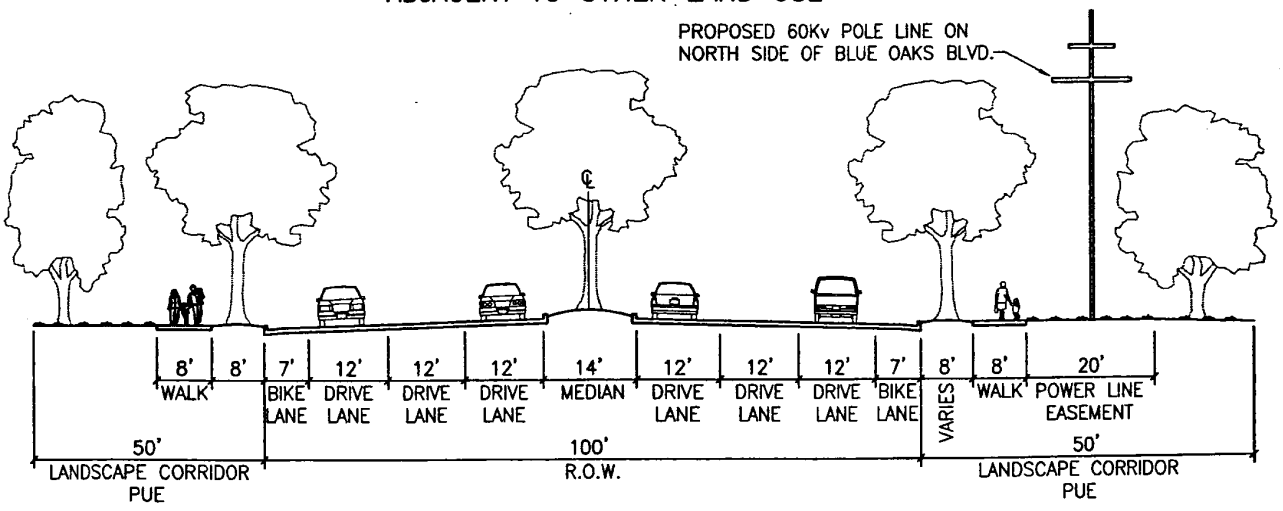
Blue Oaks Boulevard

ADJACENT TO OPEN SPACE



100' R.O.W.

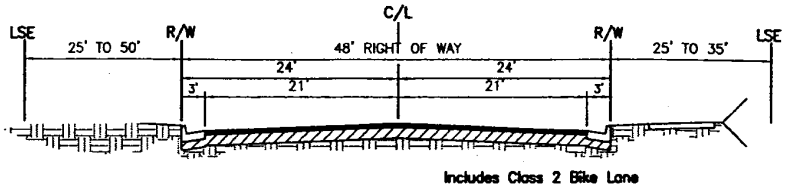
ADJACENT TO OTHER LAND USE



100' R.O.W.

Figure 7-9

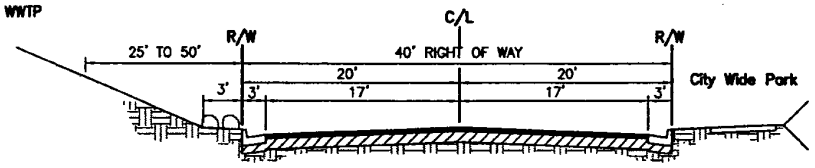
Phillip Road



Includes Class 2 Bike Lane

TYPICAL COLLECTOR STREET
48' RIGHT OF WAY

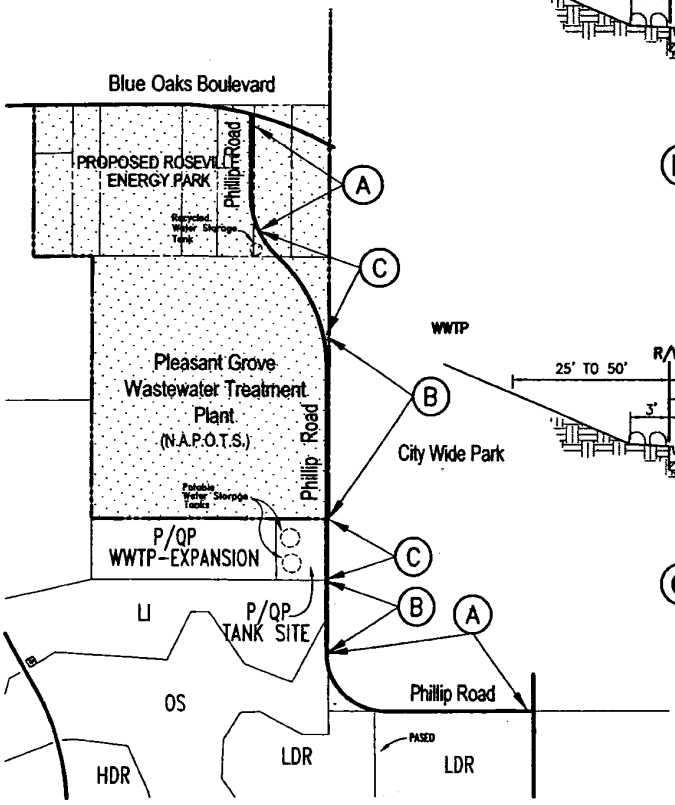
A — NORTH OF WWTP & ADJACENT TO RESIDENTIAL — NTS

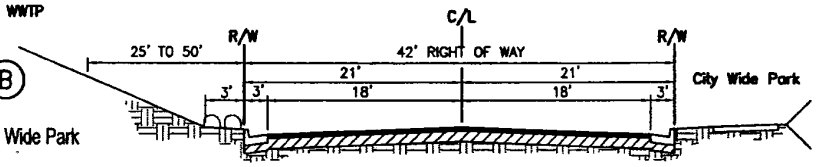


No Class 2 Bike Lane

COLLECTOR STREET
40' RIGHT OF WAY

B — ADJACENT TO WWTP — NTS





No Class 2 Bike Lane

COLLECTOR STREET
42' RIGHT OF WAY

C — NE CORNER OF WWTP @ INTX OF EXIST. PHILLIP ROAD — NTS

NOTE:

25' LSE ADJACENT TO RESIDENTIAL, 35' LSE ADJACENT TO NON RESIDENTIAL, 20' LSE REQUIRED ADJACENT TO PLEASANT GROVE WASTEWATER TREATMENT PLANT AND CITY PARK. (SEE FOOTNOTE #6 ON TABLE 7-1)

12.2 Common Elements

This section addresses items where Design Guidelines are to be applied uniformly to all aspects of the Plan Area. The intent is that as the Plan Area builds out, certain features are designed consistently (i.e. streetscape) to ensure that a visually cohesive community is created.

12.2.1 Street Landscaping

The streetscapes in the WRSP will be consistent with the high-quality landscape design concepts and elements in the existing specific plan areas adjacent to the WRSP. Using similar planting concepts, materials, and sidewalk configurations, this will ensure that the WRSP is well-integrated into the City's built enviornment

12.2.1.1 Typical Landscape Corridor Design

All streets shall be landscaped with a combination of trees, shrubs, and groundcover, as illustrated in the attached roadway sections (Figures 12-2 to 12-10), consistent with the following standards:

Primary Street Trees are located closest to the roadway and provide each street with its scale and form. Primary street trees shall be:

- The dominant element on the streetscape.
- Consistent with the attached plant palette.
- Spaced 30-feet on center.
- Planted from a minimum 15-gallon container (except in Village Center where minimum 24"-box specimens are required).
- Planted in a regular linear fashion, set back from the curb far enough to accommodate ulitmate growth (a minimum of 5-feet).
- Drought-tolerant when established.

Secondary Street Trees, where required, shall be used to add contrast and background to the linear plantings of primary street trees. Secondary trees can also be used to proivde color and accents at neighborhood entries and at points of interest along the streetscape. Secondary trees shall be:

- Planted in informal fashion as determined by space and tree species (unless otherwise specified by a particular street section).
- Consistent with the attached plant palette.
- Distinctive in form and/or color.
- Complementary to the form of the primary street tree.
- Planted from a minimum 15-gallon container.
- Spaced an average of 30-feet on center, or in equivalent quantities if plannted in informal fashion

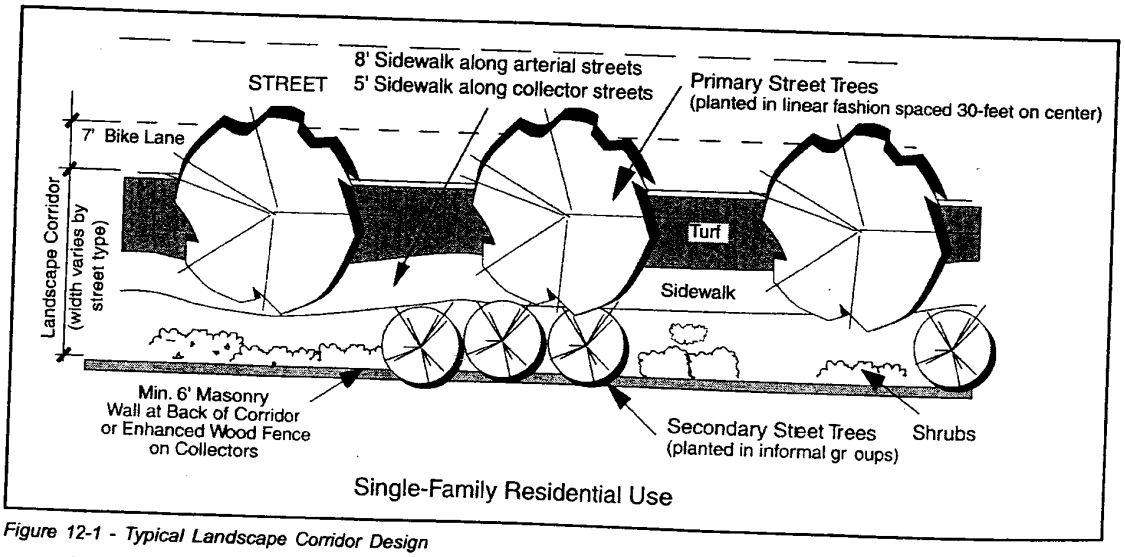


Figure 12-1 - Typical Landscape Corridor Design

Shrubs shall be used in landscape easements and medians to provide a visual barrier to fences, walls, and utility equipment, soften the ground plane, and visually link all landscape materials. Shrubs shall be:

- Planted from a minimum 1 to 5-gallon container.
- Selected according to size, color, texture, and seasonal interest.
- Consistent with the attached plant palette.
- Placed to not obstruct important pedestrian or vehicular sight lines or threaten the safety of pedestrians.
- Shall not conflict with utility screening.

Groundcover shall be planted in all portions of landscape easements and/or medians not planted with shrubs. Selection of plant material should consider the pedestrian use of a particular area. High-activity areas such as through parks and pedestrian corridors, should be planted with turf. Low-activity areas, such as along major streets, should use a combination of turf and foliage-type groundcovers. Utiliztion of groundcover shall consider the following:

- Turf should be planted in parkway strips between the sidewalk and curb on arterial and collector streets.
- Non-turf groundcover (or a combination of turf and non-turf groundcover) is preferred behind the back of sidewalk.
- Turf shall not be planted in medians
- Where turf is planted via hydroseeing, those areas shall have strict weed-abatement measures implemented.
- Turf and groundcover areas shall be defined with concrete mow strips.
- Turf may be installed in areas with slopes of 3:1 or less. Non-turf groundcovers shall be installed on slopes steeper than 3:1.
- Drought-tolerant groundcover species, including turf that requires low-water usage, are encouraged.
- Mow strips shall be utilized at the edges of formal landscape areas, or where needed to delineate the limits of maintenance.

12.2.1.2 Arterial Roadway Landscape Corridors

Blue Oaks Boulevard

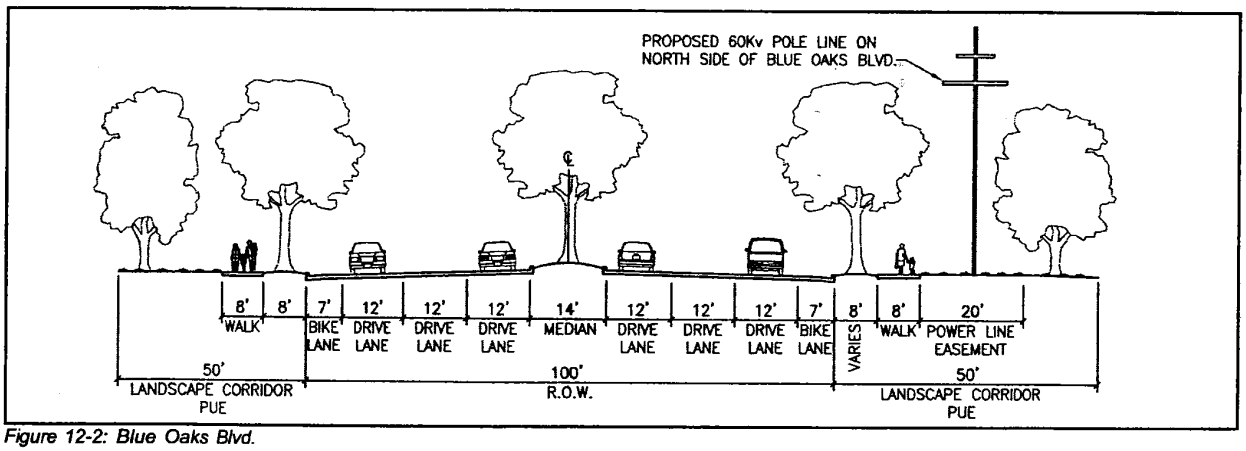


Figure 12-2: Blue Oaks Blvd.

West Side Drive

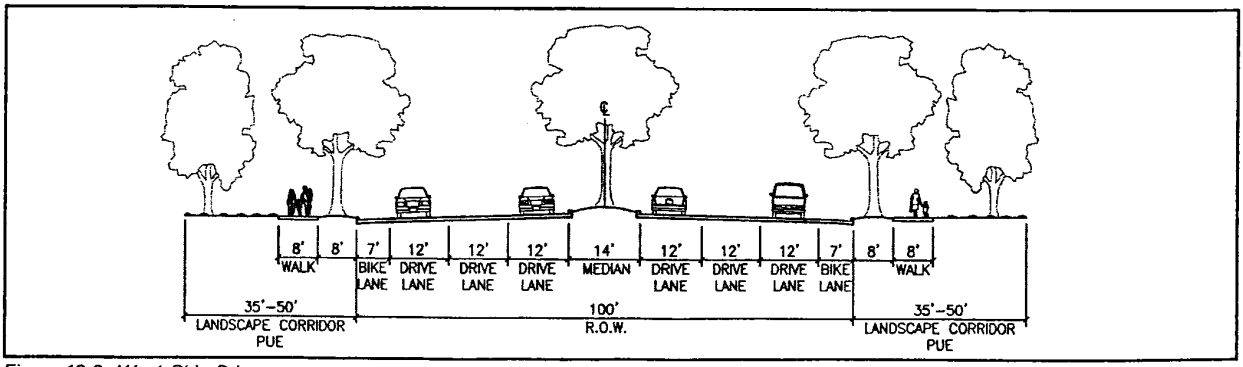


Figure 12-3: West Side Drive

12.2.1.2 Arterial Roadway Landscape Corridors (cont.)

Pleasant Grove Boulevard

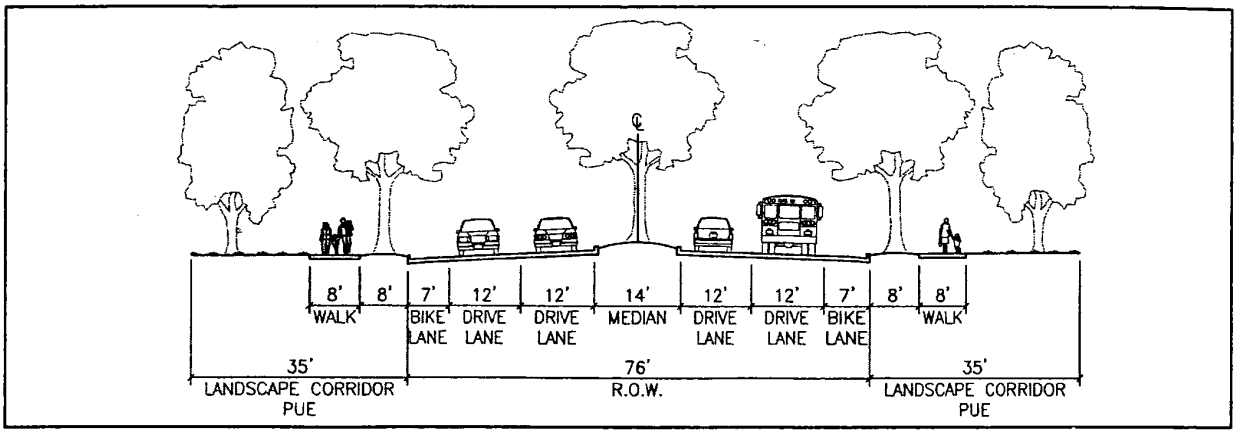


Figure 12-4: Pleasant Grove Blvd. Section

Note: Refer to the Village Center chapter of the Specific Plan document (Chapter 10) for specific requirements for Pleasant Grove Boulevard through the Village Center.

Fiddyment Road Landscape Corridor

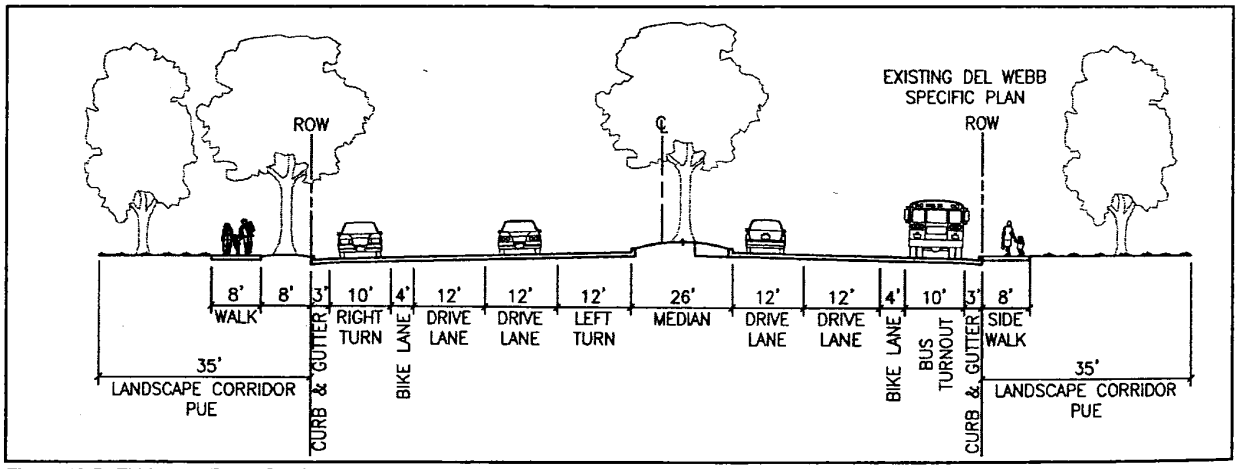


Figure 12-5: Fiddyment Road Section

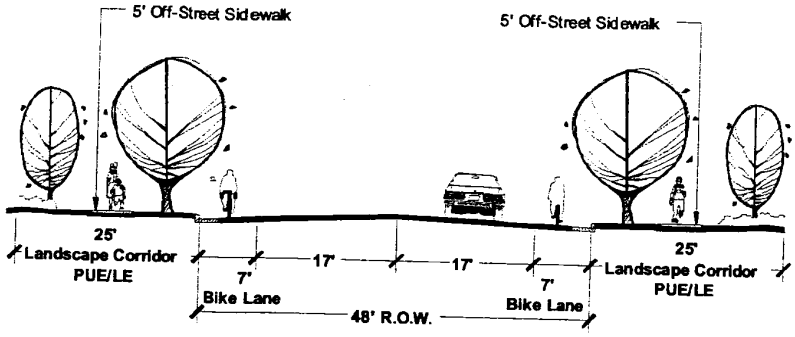
12.2.1.3 Blue Oaks Blvd. Landscaping within Power Line Easement

In addition to standards for all landscape corridors noted above, the following additional standards shall apply in that portion of the landscape corridor that may be used for the powerline, as shown in Figure 12-2.

- Landscaping within the 20 foot power line easement is restricted to shrubs, groundcover, lawn and trees selected from Secondary Tree Group 2, Appendix 01.
- No permanent structures other than electric utilities may be placed upon this electric easement.
- Lighting structures and landscaping within the powerline easement should not exceed 15-feet above ground elevation, and should not be within 25-feet of the nearest high-voltage transmission line conductor.
- Berms should not be placed next to the base of powerline poles.
- Drip lines of all trees shall be maintained at a minimum of 6-feet.
- All grading, landscape structures (including lighting and fencing) and landscaping on a public-utility easement or near a public utility is subject to final approval by the City.
- The 8-feet wide sidewalk is allowed to meander within and adjacent to the existing 20-feet wide public-utility easement.

12.2.1.5 Phillip Road Landscape Corridor

Special landscape requirements are specified for Phillip Rd. due to the limited right-of-way available near the wastewater treament plant. ***Please refer to the Circulation section for more information.***



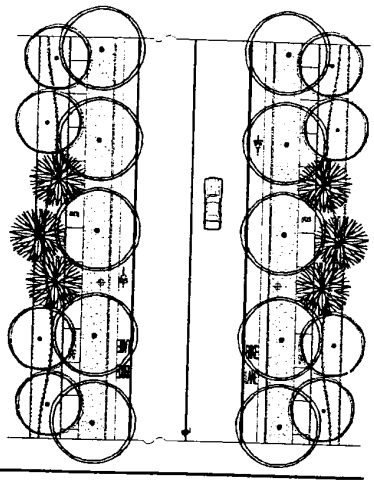
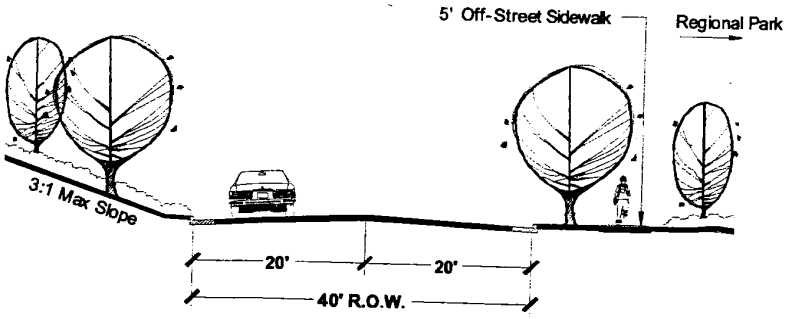


Figure 12-8: Phillip Road



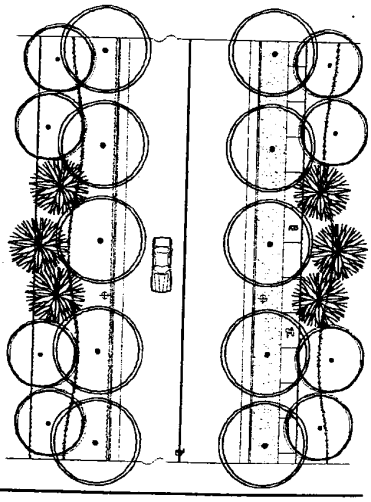
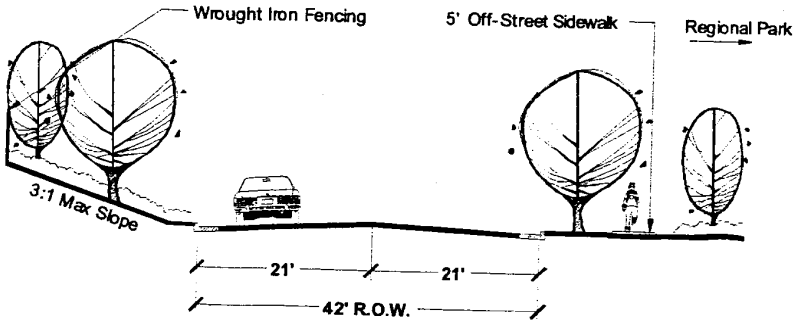


Figure 12-9: Phillip Road



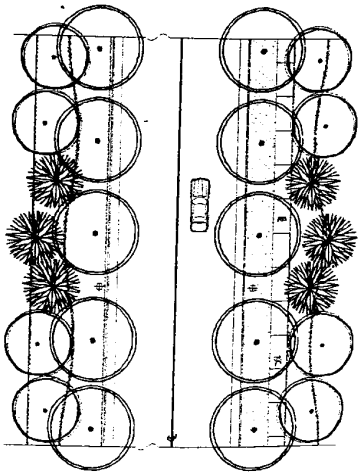


Figure 12-10: Phillip Road

Responses to

CEC Staff Data Requests

Data Requests 48-50: Noise

Application for Certification

for the

Roseville Energy Park

Roseville, California

03-AFC-01

Submitted by

Roseville Electric

February 2004

Technical Area: Noise (48-50)

WRSP Noise levels

48 *Please model and summarize the plant noise levels at the nearest proposed new residential developments to the West, Northeast, and East of the REP site. If the modeling incorporates the above proposed sound walls, please provide documentation verifying the planned construction of these sound walls and define whether the construction of these sound walls is considered part of the REP project or part of another project by the City of Roseville.*

Response: Noise level estimates were developed for the nearest planned WRSP residential areas to the west, northeast and east of the REP project site (Table DR48-1). Estimates were developed based on modeled noise levels as indicated in AFC Table 8.7-4, assuming only geometric spreading losses. The estimates are therefore conservative, as atmospheric and other attenuating effects are not considered. These noise estimates are compared with predicted future roadway noise levels, as indicated in the WRSP EIR, for roadways adjacent to or near these residential areas, to account for the increase in ambient noise from roadways and other sources that will be present in the future, when West Roseville is fully developed.

Table DR48-1. REP noise level estimates at proposed WRSP residential developments.

Type of Residential Use (High or Low Density)	Direction	Distance (ft)	REP Sound Level (L_{eq}, dBA)	2020 Traffic Noise Level (L_{eq}, dBA)[1]
High	W	1500	48	61[2]
Low	SW	1725	47	61[2]
Low	NE	1875	46	55[3]
Low	E	2850	43	56[4]

1. Source: Table 4.5-11, West Roseville Specific Plan and SOI Amendment Area EIR. L_{eq} derived from L_{dn} estimates at 100 feet from roadway centerline.
2. West Side, Pleasant Grove to Blue Oaks.
3. Hayden, North of Blue Oaks
4. Hayden, South of Blue Oaks

The sound level due to the REP will be significantly lower than the predicted future (2020) traffic noise level at 100 feet from the roadway centerline adjacent to the nearest planned residential areas to the REP.

Additional noise attenuation will result from the erection of 6-foot-high masonry walls between the arterial and collector streets in West Roseville and the residential areas. These walls will be installed per WRSP design guidelines as part of the WRSP buildout, not as part of the REP. Where these noise barriers break the line of sight between the REP and the receptor (for example, backyard of a residence shielded by a barrier), they can cause a noise reduction of 5 dBA.

Intervening structures will also serve as noise barriers. For example, commercial or industrial buildings located west of the REP would likely block noise stemming from sources at the REP that are elevated, such as the air inlets. The first row of residences will also shield subsequent rows.

The WRSP EIR includes several specific mitigation measures that require the project developer to demonstrate that residential noise levels will be consistent with City's standards. Specific recommendations include an acoustical study that addresses adequate setbacks, soundwalls/barriers and building orientation. In addition, residences in the Village Center that front roadways are required to implement many architectural and acoustic design measures (sound-rated windows, solid core doors, air conditioning, etc.). These design measures are estimated to provide up to 30 dB reduction from outside to inside noise levels.

WRSP Noise levels

49 *Please identify the standard descriptor pertaining to the measurement of 58 dBA cited in the AFC for the WRSP area (L_{eq}, L_{90}, L_{dn},…).*

Response: The estimate of possible future ambient noise levels referred to in the AFC is 58 dBA L_{dn}.

WRSP sensitive receptors

50 Please identify the locations of the nearest planned churches, hospitals, libraries, nursing homes and other schools included in the WRSP plan, if any, and their distances to the REP site.

Response: Table DR50-1 indicates the approximate distances from the WRSP to the nearest planned school sites. There are currently no locations specifically indicated in the WRSP for churches, hospitals, libraries, or nursing homes. The village center area on Bob Doyle Drive, however, might be the location for any of these facilities. The village center is located 1.2 miles from the REP.

Table DR50-1. Potential future sensitive receptors within one mile of the site.[1]

Name	Address	Distance (miles)
Elementary school	West Side Drive	0.5
Elementary school	Hayden Parkway	0.4
High school	Bob Doyle Drive	0.4
Middle school	Bob Doyle Drive	0.9

[1]Sensitive receptors currently identified in the West Roseville Specific Plan.

Responses to

CEC Staff Data Requests

Data Request 51: Socioeconomics

Application for Certification

for the

Roseville Energy Park

Roseville, California

03-AFC-01

Submitted by

Roseville Electric

February 2004

Technical Area: Socioeconomics (51)

Construction workforce

51 Please confirm whether the current workforce estimates in the AFC include construction activities for transmission, water and gas lines. If not, please provide workforce estimates for the transmission, water, and gas lines by craft employment on a monthly basis.

Response: The construction work force estimate presented in Table 8.1-8 of the AFC includes the work force for construction the energy center and associated linear facilities (natural gas, transmission, recycled water).

Responses to

CEC Staff Data Requests

Data Requests 52-57: Soil and Water Resources

Application for Certification

for the

Roseville Energy Park

Roseville, California

03-AFC-01

Submitted by

Roseville Electric

February 2004

PGWWTP schedule

52 *Please provide a schedule for the completion, testing, and EPA licensing of the PGWWTP and its expected commercial operation date.*

Response: The first phase of PGWWTP testing is complete. The second and final phase of testing is scheduled to take place in February and March 2004. The city received a permit to operate the PGWWTP plant in June 2000. The plant is scheduled to be in commercial operation by August 2004.

Recycled water use

53 *Please provide in tabular format a summary of all existing and expected customers of PGWWTP recycled water, quantifying average and peak (if available) recycled water demand in acre-feet and the expected duration of each recycled water service agreement in years.*

Response: Attachment SW-1 is the recycled water study prepared in May 2003 for the West Roseville Specific Plan area. This report provides recycled water demand information for PGWWTP recycled water.

On-site storage tank

54 *Does the REP propose to shut down in the event of a PGWWTP outage longer than the capacity of the on-site storage tank (1 million gallons)? Will there be a back-up water supply and how much of the on-site storage tank capacity is dedicated to fire fighting requirements? Please provide a discussion or contingency plan for plant operation in the event of a disruption of recycled water from the PGWWTP.*

Response: The 1-million-gallon service/firewater storage tank will store water for process needs and fire protection. The tank will be designed with a standpipe on the process outlet so as to reserve a minimum of 240,000 gallons for fire protection. In the event of an interruption of the supply of recycled water from the PGWWTP, the tank will provide up to 760,000 gallons of process storage. At the average demand of 491 gpm (base load at 62 °F ambient), this storage will allow the REP to operate during recycled water supply interruptions of up to 25.8 hours. At the peak demand of 1,189 gpm (peak load at 99 °F ambient), this storage will allow the REP to operate during recycled water supply interruptions of up to 10.6 hours. Because of the reliability and redundancy inherent in the design of modern-day wastewater treatment plants such as the PGWWTP, interruptions in the supply of recycled water exceeding 10 hours are expected to be extremely rare. Nonetheless, in the event there is an interruption in the supply of recycled water that causes the exhaustion of the process storage available in the service/firewater storage tank, the REP will be shut down, due to the lack of a back-up water supply.

Storm Water Pollution Prevention Plan

55 *Provide a draft Storm Water Pollution Prevention Plan per the requirements of the General Permit to discharge storm water associated with construction activities for the REP, the laydown area, and*

for the preferred alternatives for the linear facilities (transmission line and gas pipeline) that includes the following:

a) *Colored map drawings at 1''=100' or less that depict existing and proposed topography (contours) with labeled elevation numbers, arrows showing run on and runoff, structures, drainage facility locations, staging areas, and both on- and off-site soil stockpile areas on the drawings;*

b) *Best Management Practices (BMP) and a construction sequence on the drawings. Please provide in the narrative the full title and date of the BMP handbook used for BMP selection;*

c) *A complete mapping symbols legend on the drawings;*

d) *On-site storm water calculations in the narrative;*

e) *Provide supporting data regarding the routing of on- and off-site runoff volume and flow rate for the 10-year and 100-year, 24-hour storm events;*

f) *Address procedures that will be used to handle potential construction runoff impacts;*

g) *Monitoring and sampling protocols for erosion, storm water runoff control and stabilization procedures; and*

h) *Narrative text that describes the project, storm water pollution and erosion control BMPs, as well as those controls that meet the general standards of Placer County Flood Control and Water Conservation District "Storm water Management Manual", the City of Roseville's Municipal Storm Water Management Plan and the Department of Public Works – "Improvement Standards."*

Response: The draft SWPPP will be provided to Staff in a separate filing.

City of Roseville Permits

56 Please provide all information required by the City of Roseville for:

a) a Municipal Industrial Wastewater Discharge Permit;

b) a Recycle Water Permit; and

c) a Grading Permit.

Response: The City of Roseville will not require a permit application for the REP for a Municipal Industrial Wastewater Discharge Permit or a Recycled Water Permit because the REP is a City-owned project that the City Council will have approved prior to construction (Art O'Brien, Department of Environmental Utilities, City of Roseville, personal communication). The information requirements for a grading permit (Grading Plan Approval) include the following (Roseville Municipal Code 16.20.050):

- Name of the project
- Project description
- Start date
- Cubic yards of earth to be moved
- Property owner name, address, and signature
- Applicant name, address, and signature

- Developer's name, address, and signature
- Plan drawings, including the following:
  - Proposed grades, street grades, slopes
  - Methods of drainage
  - Natural features, including wetlands, streams, and slopes
  - Existing trees with elevations of trunk
  - Quantities of cut and fill
  - Locations of public utility easements and utilities

Additional information required may include:

- Arborist's report of native oak trees
- Wetland delineations
- Mitigation plans for wetlands and native oaks
- Haul routes
- HEC II water modeling analysis

Spill Prevention Control and Countermeasure Plan

57 Please provide a draft SPCC Plan for the REP.

Response: The SPCC Plan for operation will be provided to Staff in a separate filing.

ATTACHMENT SW-1

Recycled Water Study

West Roseville Specific Plan

Recycled Water Study
for
West Roseville Specific Plan Area
(Fiddyment Ranch/Westpark Properties)

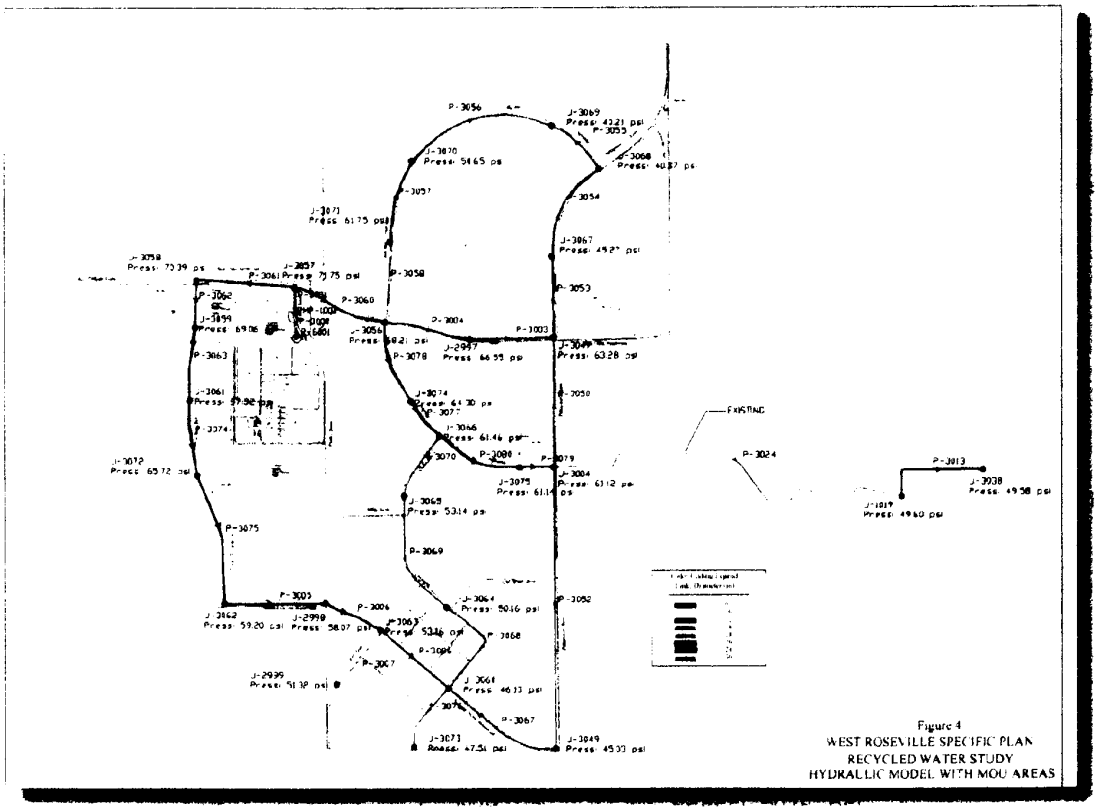


Figure 4
WEST ROSEVILLE SPECIFIC PLAN
RECYCLED WATER STUDY
HYDRAULIC MODEL WITH MOU AREAS

May 21, 2003

HydroScience Engineers, Inc.

Recycled Water Study

For

West Roseville Specific Plan Area

(Fiddyment Ranch/Westpark Properties)

May 21, 2003

Prepared By

HydroScience Engineers, Inc.

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RECYCLED WATER STUDY

Introduction

This West Roseville Specific Plan (WRSP) recycled water system study was prepared by HydroScience Engineers, Inc. (HSe), in support of the Master Water Study for the West Roseville Specific Plan Area, prepared by Wood-Rodgers. The purpose of this study is to evaluate proposed recycled water users, demands, supplies, facility requirements, and operational requirements. This information is developed to a conceptual level, based on available information from the current level of planning. This report focuses primarily on the WRSP Area, consisting of Fiddyment Ranch and Westpark properties. However, preliminary information is included for MOU Transition Areas 1 and 2 where feasible.

Background

Several studies, evaluations, and technical memoranda have been prepared in recent years to plan existing and future recycled water facilities in the City of Roseville. Background information is used from many of these studies, as described below. To the best extent possible, this current study uses methodologies and results from previous studies to maintain consistency with documents already accepted by the City.

Recycled Water Distribution System Feasibility Study

HSe prepared a *Recycled Water Distribution System Feasibility Study* (Feasibility Study) for the City of Roseville in April 2000. Methodologies were developed and used in the Feasibility Study to estimate recycled water demands based on irrigated acreage and evapotranspiration data. The Feasibility Study reviewed the existing recycled water distribution system, supplied by the Dry Creek WWTP. In addition, the study developed several phased expansion projects for the City's recycled water system. This included phased expansions to be built both before and after completion of construction of the new Pleasant Grove WWTP. The Feasibility Study was prepared before any information regarding the WRSP area was available. The phases included in the Feasibility Study are summarized below:

Phase I

This included the existing recycled water system as of April 2000. The existing system provided service to Sun City Roseville (golf course, streetscapes, parks), Woodcreek Oaks Golf Course, Junction Boulevard Streetscapes, and Elliot Park. A unique feature of this system is that it operates at a relatively low pressure. A pressure of approximately 30 psi is required at the service connection at Sun City Roseville to ensure proper operation of a booster pump station at that site. An existing recycled water pump station at the Dry Creek WWTP supplies this system.

Phase II

Phase II is a proposed expansion to the system, prior to completion of the Pleasant Grove WWTP. This expansion adds a storage tank, pump station, and distribution pipeline to provide recycled water to the Diamond Oaks Golf Course and several other customers along the way. The new portion of the distribution system served by the new pump station operates under a pressure range of 50 – 60 psi. Thus, this phase creates a "high" pressure zone, served by the new pump station, and a "low" pressure zone, served by the existing pump station at the Dry Creek WWTP. The two zones are interconnected by a pressure reducing valve (PRV). It is important to note this two pressure zone system, as it affects any future connections to the system from the proposed WRSP system. In addition, this phase provides supply of recycled water to the West Placer CFD #1 via a gravity pipeline. Construction of this phase was completed in 2002.

Phase III

Phase III expands the system further to include all customers that were identified as feasible in the Feasibility Study. This phase would be constructed by approximately 2005, after completion of the Pleasant Grove WWTP. The Phase III project included a cumulative total annual demand of approximately 4,300 acre-feet per year (AFY). The Phase III project required that new and existing pipelines be constructed and/or utilized to convey recycled water from the Pleasant Grove WWTP to the storage tank that was constructed in Phase II. The water balance prepared for the Phase III project required that approximately 2,333 gallons per minute of recycled water would be pumped from the Pleasant Grove WWTP to the new storage tank between the hours of 12:00 am and 6:00 am to meet the tank fill requirements to provide service during peak demand periods.

The recommended Phase III project from the Feasibility Study is shown on **Figure 1**. Note that this project includes a new 20-inch diameter pipeline from the Pleasant Grove WWTP to the existing sewer pump station #5 along Fiddyment Road. In addition, the project would utilize an existing 18-inch diameter sewer force main to convey the water from pump station #5 to the storage tank. It was not envisioned that pump station #5 would be used to pump recycled water. The existing force main would be disinfected and converted to a recycled water main after sewer pump station #5 is abandoned as a result of construction of the new sewer interceptor to the Pleasant Grove WWTP.

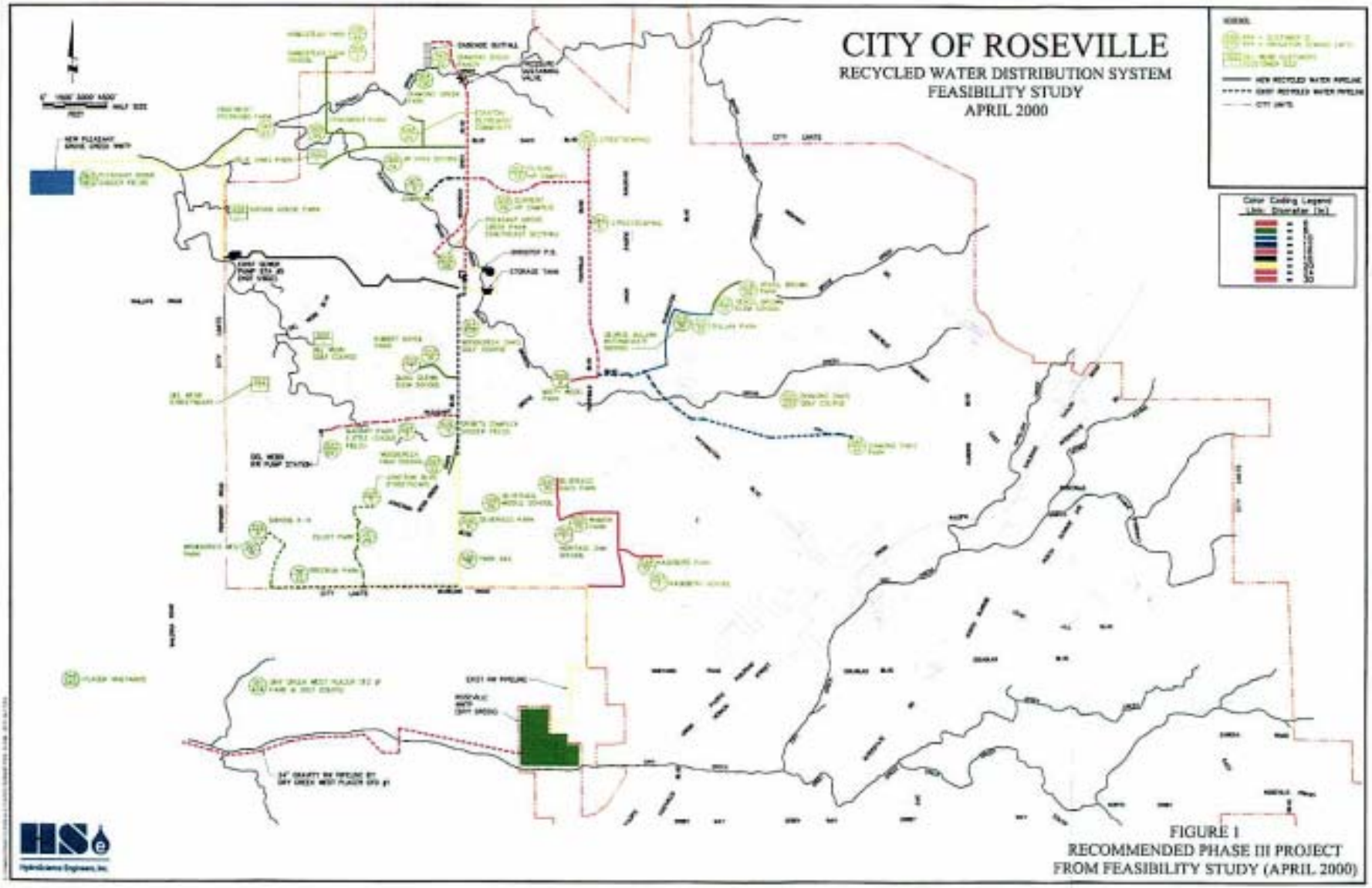


FIGURE 1
RECOMMENDED PHASE III PROJECT
FROM FEASIBILITY STUDY (APRIL 2000)

HSe Technical Memorandum #1 - Pleasant Grove WWTP Recycled Water Pump Station Design Parameters

In August 2000, the City asked HSe to prepare a technical memorandum to determine design parameters for a recycled water pump station at the new Pleasant Grove WWTP. The technical memorandum evaluated a scenario where the Pleasant Grove WWTP would be the sole source of water for filling the tank for operation of the Phase III project. This scenario was not evaluated in the Feasibility Study. This scenario would give the City flexibility to operate the system if recycled water is unavailable from the Dry Creek WWTP. For this tank fill scenario, the technical memorandum recommends a pump station at the PGWWTP with a capacity of approximately 6,400 gpm at a total dynamic head (TDH) of 105 feet. In addition, for this flow rate, the technical memorandum recommended 24-inch diameter pipeline from the PGWWTP to the existing sewer pump station #5. This scenario also utilized the existing 18-inch sewer force main from sewer pump station #5 to the storage tank. This scenario did not consider retrofitting the sewer pump station. Subsequently, the pump station at the Pleasant Grove WWTP was designed and constructed per the recommendations of Technical Memorandum #1. The 24-inch diameter pipeline recommended in the Technical Memorandum is larger than the 20-inch recommended in the Feasibility Study because the Technical Memorandum considered a flow scenario that was not considered in the Feasibility Study, as described above.

City Recycled Water Supply and Power Plant Demand Estimates

Subsequent to preparation of the Feasibility Study, Enron proposed construction of a 750 – 900 Megawatt power plant adjacent to the new Pleasant Grove WWTP. It was assumed that this power plant would be constructed by approximately 2005. No phasing of the power plant construction was proposed or discussed.

Enron developed estimates of average day and peak day water consumption for cooling purposes at the proposed power plant. These estimates were provided to the City. The City then developed preliminary estimates of recycled water supply available from the Pleasant Grove WWTP to assess the City's capacity to supply recycled water to the facility for cooling purposes. Several alternative supply scenarios were developed by the City. These scenarios varied the wastewater generation unit factor from 200 gallons per day per equivalent dwelling unit (gpd/EDU) to 260 gpd/EDU. In addition, the scenarios varied the rate of growth between 75 percent and 100 percent of that projected in the engineers report used for revenue projections. Four separate supply estimates were prepared by combining the variations described above.

Montgomery Watson Harza Technical Memoranda

Montgomery Watson Harza (MWH) prepared several technical memoranda in support of the WRSP Master Water Study. These technical memoranda evaluate the City's water demand unit

factors based on an analysis of metered water use and land use information. The memoranda revise and reduce the unit factors developed in a previous report prepared by Spink in 1993.

The memoranda also evaluate recycled water demands in support of developing alternative supplies of water. *Task 7 – Water Supply Strategy* (November 2002) evaluates recycled water demand under three scenarios: "normal use", "semi-aggressive use", and "aggressive use". "Normal use" includes typical applications of recycled water for golf course, parks, schools, and publicly landscaped areas. "Semi-aggressive" use extends the use of recycled water to commercial, industrial, and multi-family open space areas. "Aggressive use" would extend the use to all residential outdoor uses. MWH used the "normal use" scenario to estimate demands for the existing City and the "semi-aggressive" scenario to estimate demands for the WRSP area. MWH estimated the maximum "existing City" demand to be approximately 3,000 AFY. In addition, they estimated the WRSP area demand to be 1,100 AFY, with an additional 800 AFY for the MOU transition areas 1 and 2.

Note that "existing City" demand per the MWH memorandum is defined as the buildout recycled water demand in all other areas of Roseville, besides the WRSP or MOU transition areas. Thus, "existing City" demand includes future recycled water demands in existing and planned portions of the City that are not yet built or connected.

Reconciliation of "Existing City" Demand Estimates

As noted above, MHW technical memorandum Task 7 estimates the ultimate demand for the "existing City" (not including WRSP and MOU transition areas) to be approximately 3,000 AFY. This demand used in the MHW memorandum was developed in coordination with City staff. However, the Feasibility Study estimated a Phase III ultimate demand of 4,306 AFY. The difference in the estimates for ultimate demand in the "existing City" is due to partly to the fact that the Feasibility Study Phase III ultimate demand included some customers that are now counted within the WRSP area, not the "existing City" area. Also, an assumption was made, during preparation of the MWH technical memoranda, that some of the recycled water customers estimated in the Feasibility Study will not be connected. In order to complete the hydraulic and water balance analysis in this Study, these differences must be reconciled. The City has indicated that an "existing City" ultimate recycled water demand of approximately 3,000 AFY should be used for planning purposes. A set of customers that could be deleted from the Feasibility Study Phase III customer set to result in an "existing City" ultimate demand of approximately 3,000 AFY is described below.

The Phase III project in the Feasibility Study included estimates for "existing City" recycled water demands for two customers in the area that is now described as the WRSP area (Pleasant Grove Soccer Fields, 463 AFY; Fiddyment Pistachio Farm, 67 AFY). All recycled

water demands in this area are now counted as WRSP recycled water demands, based on the land use map for the WRSP area. Thus, the recycled water demands estimated in the Feasibility Study for customers in this area should no longer be counted as "existing City" customers. This results in a reduction of 530 AFY from the Feasibility Study Phase III ultimate demand for existing City customers. Note that the WRSP includes a regional park that will include recreational facilities such as soccer fields. Also, the land use map for WRSP includes other parks, commercial, and HDR land uses that will have recycled water demands. The demands previously estimated for Pleasant Grove Soccer Fields and Fiddyment Pistachio Farm are captured in the recycled water customer demands estimated based on the land use map for the WRSP area. However, these demands are now counted as WRSP demands, not "existing City" demands, since "existing City" demands only include demands outside of the WRSP and MOU transition areas.

Another potential deletion is the future Placer Vineyards development. If this customer were deleted, total "existing City" demand would be reduced an additional 565 AFY. Also, the City may not connect a number of existing schools and parks due to retrofit costs and/or difficulties. These include Quail Glen Elementary School, Robert Doyle Park, Woodcreek High School, Silverado Middle School and Park, Silverado Oaks Park, Wanish Park, Heritage Oak School, Kaseberg Park and School, Buljan Park and School, and Vencil Brown Park and School. Eliminating these customers reduces the "existing City" demand another 388 AFY.

For purposes of analysis of hydraulic and water supply balances, we have deleted the following customers from the Feasibility Study Phase III customer set to result in an "existing City" demand that is comparable to the demand estimated in the MWH technical memoranda:

- Pleasant Grove Soccer Fields
- Fiddyment Pistachio
- Placer Vineyards

Deleting these customers results in an "existing City" ultimate demand of 3,211 AFY. This demand is similar to the "existing City" ultimate demand estimate from the MWH technical memoranda.

Planning Criteria

In this section, engineering criteria are described for the following purposes:

- Estimating average, peak day and peak hour recycled water demands; and
- Sizing of pipelines, reservoirs, and pump stations during hydraulic modeling.

The criteria described below for estimating demands is similar to the criteria used in the Feasibility Study for estimating recycled water demands. Demands are calculated using estimated irrigated surface areas, evapotranspiration rates, and precipitation data. This procedure is described below.

Estimated Irrigated Surface Area

Total surface areas for each customer were obtained from a draft land use map dated April 28, 2003, referred to as Admin Draft 3A. However, not all surface area for each customer will be irrigated. For example, parks will include sidewalks. High density residential areas will include buildings and walkways. Thus, factors were applied to the total surface areas to estimated *irrigated* surface areas. These factors are different for each land use and are described in **Table 1** below.

Table 1 • Irrigated Surface Area Factors

Land Use Type	Irrigated Surface Area Factor (Ratio of Total Surface Area to Irrigated Surface Area)
Parks, including paseos	0.90
Public/Quasi Public (schools, churches, fire station)	0.50
High Density Residential	0.40
Community Commercial, Business Professional, Light Industrial	0.30

The factor used for estimated irrigated surface areas for parks accounts for sidewalks and other hard-scaped areas that would not be irrigated. Note that it is expected that the some regional parks in WRSP will remain oak woodland and will not be irrigated. However, the City requested that the engineer assume that all parks are irrigated for purposes of estimating demands. The factor used for estimating irrigated surface areas for public/quasi public land uses was calculated by reviewing aerial photographs of existing schools in Roseville located adjacent to parks. It is assumed that this school/park configuration is representative of the planned configuration at the WRSP area. The factor for estimating irrigated surface areas for CC/BP/LI is an estimated based on other studies recently prepared for Sacramento County.

The factor used for estimating irrigated surface areas for high density residential land uses was determined by reviewing ratios of irrigated to total areas at several apartment complexes that use recycled water in Dublin, California. These apartment complexes were built recently, and the grounds at these complexes were designed to use recycled water. Thus, it is assumed that the ratio of irrigated to total surface area for these apartment complexes in Dublin is

representative of the HDR land uses in WRSP. Note that the factors shown in **Table 1** were used only to estimate the percentage of *irrigated* surface area based on a *total* surface area. These irrigated surface areas were then used, along with evapotranspiration data specific to Roseville, to estimate recycled water demands. No climatological data specific to Dublin was used to estimate recycled water demands.

In addition to the land uses above, irrigated areas were estimated for streetscapes using lengths calculated from the land use map and typical widths for landscape medians and parkways provided by Wood-Rodgers.

Evapotranspiration Rates

Evapotranspiration rates (ET) are a measure of water usage by a particular crop and are a function of net solar radiation, air temperature, wind speed, and vapor pressure. Evapotranspiration rates for a specific crop in a specific location are calculated on a monthly basis by the following equation:

$$ET = ET_0(k_c)$$

where:

ET_0 = Normal year reference crop evapotranspiration rate for a given geographic location (California Department of Water Resources (DWR), California Irrigation Management Information System (CIMIS) database).

k_c = Crop coefficient for a given crop (DWR Leaflets).

For this study, reference crop evapotranspiration rates (ET_0) for the City of Roseville were obtained from the DWR CIMIS database. Crop coefficients for cool weather turf grasses were obtained from University of California, Division of Agriculture and Natural Resources Leaflet 21427. Calculated ET rates and irrigation demands are shown in **Table 2**.

Precipitation Data

Annual precipitation data for the Sacramento area was obtained from the California DWR. Annual rainfall values from 1850 through 1998 were averaged to obtain typical annual rainfall data. A breakdown of rainfall by month was calculated using typical monthly rainfall percentages (DWR Bulletin No. 113-3).

Estimated Unit Irrigation Demands

Typical monthly unit irrigation demands for turf grasses are summarized in **Table 2** and were calculated using the following formula:

$$ID = \frac{\left[ET - Pe_p\right] l_r}{e_i}$$

where:

ID = Irrigation demand in inches.

ET = $(ET_0)(k_c)$ = Evapotranspiration for turf grasses in Roseville.

P = Average precipitation, DWR.

e_p = Precipitation irrigation efficiency, 0.8. Assumes 20% of rainfall during growing season is lost to evaporation, runoff, etc.

l_r = Loss Rate, 1.1. This assumes that approximately 10 percent of the applied water passes through the grass root zone and is lost.

e_i = Irrigation efficiency, 0.8 - 0.9 depending on season. This assumes that 10 – 20 percent of the applied irrigation water is lost to evaporation.

As shown in **Table 2**, the total annual unit irrigation demand for grasses is estimated at 43.4 inches. A peak monthly irrigation demand of 9.2 inches is projected for July. The irrigation season is approximately seven months long (April through October). No irrigation demands are projected for November through March when it is anticipated that local precipitation will satisfy landscape irrigation requirements.

Table 2 • Typical Local Irrigation Demands

Month	ET-Turf Grass (inches)	P [a] (inches)	Irrigation Demand (inches)	Irrigation Demand (feet)
January	0.88	3.57	0.0	0.00
February	1.36	3.24	0.0	0.00
March	2.48	2.45	0.6	0.04
April	3.76	1.52	3.3	0.27
May	4.96	0.71	5.7	0.48
June	6.16	0.24	8.0	0.67
July	6.80	0.02	9.2	0.77
August	5.84	0.04	8.0	0.67
September	4.48	0.24	5.8	0.48
October	2.96	0.97	2.8	0.24
November	1.28	1.68	0.0	0.00
December	0.80	3.63	0.0	0.00
Average			**3.6**	**0.30**
Total	**41.76**	**18.31**	**43.4**	**3.62**

[a] Typical precipitation for Sacramento area based on annual average, 1850 – 1998, DWR.

Calculation of Average Day, Peak Day, and Peak Hour Demands

Average Day Irrigation Demands

The *average day demand* for a given customer is defined as the total annual water usage divided by the number of days in a year (365). Thus, *average day demand* is equivalent to what a customer's flow rate would be if water were delivered evenly, 24 hours a day, 365 days a year. A*verage day demands* are calculated (in acre-feet per year) by multiplying the irrigated surface area (in acres) by the average unit demand of 0.3 feet presented in **Table 2** above.

Peak Day Demands

Peak day flows are estimated by applying peak factors to calculated *average day demands*. Peak day flow rates account for seasonal variations due to weather and growing conditions. Based on the data shown in **Table 2**, the average monthly irrigation demand over the year is 3.6 inches. However, the peak monthly irrigation demand occurs in July and is 9.2 inches. Thus, the monthly peak demand factor is 9.2/3.6 = 2.5. It is assumed that *peak day demand* is essentially the same as peak monthly irrigation demand for facility planning purposes. This is reasonable because not all customers will be irrigating on the same day. It is further assumed that "true" peak day irrigation demand conditions (all customers irrigating on the same day) would occur so rarely that the cost of providing facilities to meet these demands is not justified. Therefore, a *peak day demand* factor of 2.5 times *average day demand* is assumed.

Peak hour delivery demands for irrigation systems are a function of the length of daily irrigation periods. A peak delivery factor of 2.67 times *peak day demand* was used to estimate peak delivery demands, assuming a 9-hour per day irrigation cycle (24 hours / 9 hours = 2.67). These unit peak factors are consistent with the information presented in the Feasibility Study.

The hourly peaking factor assumes that irrigation demands are uniform over the 9-hour daily irrigation period. Actual peaking requirements can be managed during program implementation by emphasizing water management and staggering irrigation periods between customers. A summary of peaking factors assumed for landscape irrigation in this study is provided below:

Peak Day Demand	=	2.5 × Average Day Demand
Peak Hour Delivery Demand	=	2.67 × Peak Day Demand or 6.68 × Average Day Demand

Modeling Criteria

The following criteria are used for purposes of hydraulic modeling and analysis of storage requirements:

- Minimum dynamic pressure (under peak hour conditions): 40 psi
- Maximum static or dynamic pressure: 75 psi
- Minimum pipeline diameter: 6-inches

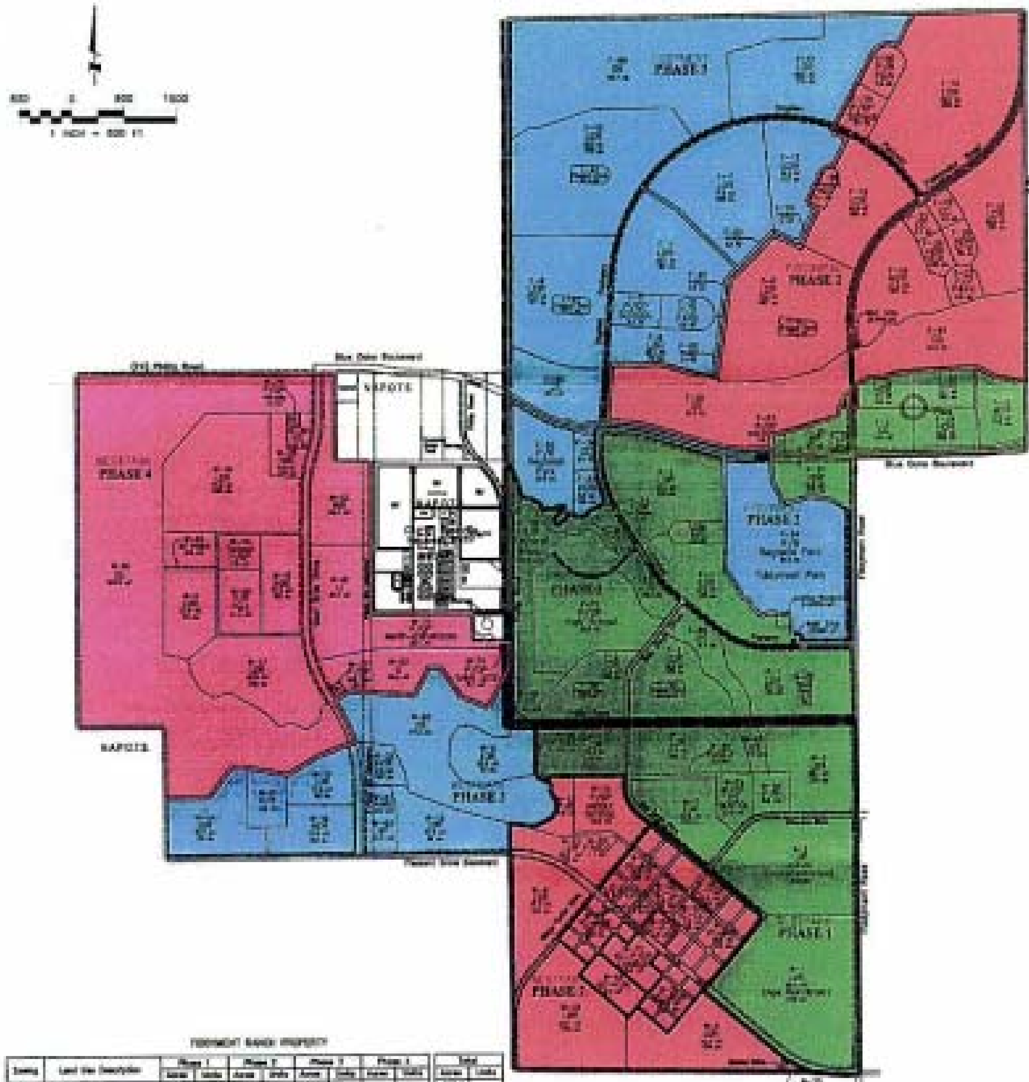
- Hazen-Williams "C" value: 130
- Desirable velocity: 3 – 5 ft/sec
- Maximum velocity: 7 ft/sec

Note that the minimum and maximum pressure criteria for this study are lower than the criteria used in the Feasibility Study. The Feasibility Study used a minimum dynamic pressure of 50 psi and a maximum pressure of 100 psi for the "high" pressure zone (see discussion above under Background). These criteria could be achieved in this study as well. However, the City prefers to maintain recycled water system pressures lower than potable water pressures in the same area. As a result, we have lowered the minimum pressure for the recycled water system from 50 psi to 40 psi. Also, we have lowered the maximum pressure criteria from 100 psi to 75 psi. This adjustment sets the pressure criteria for the recycled water system below similar criteria for the potable water system in the WRSP area. Note that dynamic pressures vary depending on demands. Since diurnal and seasonal demand patterns are different for the recycled water and potable water systems, there may be times of the day or periods of the year when recycled water pressures are higher than potable water pressures.

It was determined that at the current level of detail, extended period simulations are not required. As a result, the system is modeled at peak hour demands only.

Phasing Criteria

Phases described in this study are based on a draft phasing map dated May 7, 2003. This map is based on the land use map dated April 28, 2003 and referred to as "Admin Draft 3A". This map shows four separate phases for the WRSP area, not including the MOU transition areas. **Figure 2** shows the phases that are represented on the land use map. It is assumed that Phase 1 will be completed in the year 2005, with each subsequent phase completed every five years. This results in all four phases completed by year 2020. It is further assumed that the MOU Transition areas would be completed by year 2030.



Zoning	Land Use Description	Phase 1		Phase 2		Phase 3		Phase 4		Total	
		Acres	Units	Acres	Units	Acres	Units	Acres	Units	Acres	Units
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Zoning	Land Use Description	Phase 1		Phase 2		Phase 3		Phase 4		Total	
		Acres	Units	Acres	Units	Acres	Units	Acres	Units	Acres	Units
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Figure 2
WEST ROSEVILLE SPECIFIC PLAN
RECYCLED WATER STUDY
DRAFT PHASING PLAN

Recycled Water Customers and Demands

Recycled water customers and demands are evaluated in this section.

Customer Base

In addition to the criteria listed above, other assumptions used to evaluate the customer base are listed below:

- Semi-aggressive recycled water use, per MWH Technical Memorandum Task 7. Includes parks, golf courses, schools, publicly landscaped areas, commercial, industrial, and multi-family users.
- "Open space" constitutes "natural areas" and will not be irrigated.
- Recycled water will be used to irrigate streetscapes along RW alignments in arterial roads only. Based on information provided by Wood-Rodgers, irrigation demands are estimated for streetscapes along portions of Blue Oaks Boulevard, Hayden Parkway, Fiddyment Road, Pleasant Grove Boulevard, Westpark Drive, and "Collector Road A". In addition, streetscape demands are estimated for unnamed arterial roads with recycled water pipelines in the MOU transition areas.
- "Multi-family users" include all HDR land uses.
- "Commercial" uses are for irrigation of common areas.

It is our understanding that the "multi-family" open space uses included in the "semi-aggressive" recycled water use scenario described in MWH Technical Memorandum Task 7 was limited to high-density residential land uses. This would typically include apartment buildings where all irrigated areas are under the control of the property management. MWH also considered an "aggressive use" demand scenario, which would include all irrigation demands, including those within medium density and lower density residential land uses. However, based on discussions with the City, MWH determined that the "aggressive use" scenario was unlikely due to cost and permitting issues. As a result, the "aggressive use" scenario was dropped from further discussion in the final MWH TM Task 7. Wood Rodgers and HydroScience were instructed to use the "semi-aggressive" recycled water use approach in this study.

The actual types of structures that will be constructed within the medium density residential land use are not known at this time. The City has indicated that condominiums and/or brownstones could be constructed within the medium density land use areas. These types of structures could have commonly irrigated landscaped areas. Recycled water demands could be estimated for these uses. This would create a recycled water demand use scenario somewhere in between the "semi-aggressive" and "aggressive" approaches considered in the MWH technical memoranda. However, since these condominiums and/or brownstones would also likely include private ownership of individual units and irrigated patio areas that would be controlled by the private owners, including this type of recycled water customer would likely increase the cost and

complexity of the recycled water distribution system, monitoring, reporting, and permitting requirements. This is similar to the conclusion reached during preparation of the MWH technical memoranda for the "aggressive" use scenario. As a result, we have not included recycled water demands for any commonly irrigated areas within the medium density residential land uses.

Customer Demands

Customer demands are shown in **Table 3** and **Figure 3**. Average annual, average day, peak day, and peak hour demands are included. Demands and customers are sorted and totaled by phase. Totals are shown with and without streetscape demands. Totals with streetscape demands are used for analysis of facility requirements and available supply. Totals without streetscape demands are provided for purposes of measuring offsets from demand estimated by the MWH technical memoranda, since streetscape demands were not included in MWH estimates.

Comparison with MHW Demands from Technical Memoranda

The total annual demand estimated above for the WRSP area, not including streetscapes, is approximately 1,500 AFY. This is higher than the demand of 1,100 AFY estimated in the MWH technical memorandum. The MWH demand for recycled water use was preliminary, based on total water usage factors and did not include a detailed analysis of each customer type. In addition, it is not clear whether the recycled water demands estimated in the MWH report included irrigation of streetscapes. The estimates presented in this study are based on a more detailed analysis of each customer and land use. Therefore, the recycled water demands estimates prepared in this study are considered more refined and are used for the remainder of this analysis.

Table 3
Recycled Water Customer Demands

Phase	ID Number	Customer Name	Land Use Type	Total Site Area[1] (Acres)	% of Site Area Irrigated[2]	Site Area Irrigated (Acres)	Annual Demand (AFY)	Average Day Demand (GPD)	Peak Day Demand (GPD)	Peak Hour Demand (GPM)
1	109	CC 2	Community Commercial	2	0.30	0.60	2.17	1,939	4,848	8.98
1	110	HDR 9.7	High density residential	9.7	0.40	3.88	14.05	12,539	31,348	58.05
1	111	CC 13.4	Community Commercial	13.4	0.30	4.02	14.55	12,992	32,479	60.15
1	112	HDR 12.1	High density residential	12.1	0.40	4.84	17.52	15,642	39,104	72.41
1	113	HDR 13.6	High density residential	13.6	0.40	5.44	19.69	17,581	43,951	81.39
1	122	Park 6.0	Park	6	0.90	5.40	19.55	17,451	43,628	80.79
1	124	HDR 16.8	High density residential	16.8	0.40	6.72	24.33	21,717	54,293	100.54
1	129	Regional Park 45.8	Park	45.8	0.90	41.22	149.22	133,212	333,029	616.72
1	130	High School 53	Public/Quasi-Public	53	0.50	26.50	95.93	85,641	214,102	396.48
1	131	Fire Station 3.1	Public/Quasi-Public	3.1	0.50	1.55	5.61	5,009	12,523	23.19
1	133	BP 9.1	Business Prof./Light Industrial	9.1	0.30	2.73	9.88	8,823	22,057	40.85
1	137	Park 8.2	Park	8.2	0.90	7.38	26.72	23,850	59,625	110.42
1	143	School 10	Public/Quasi-Public	10	0.50	5.00	18.10	16,159	40,397	74.81
1	173	Pocket Park 5	Park	2.4	0.90	2.16	7.82	6,981	17,451	32.32
1	174	Pocket Park 6	Park	2.4	0.90	2.16	7.82	6,981	17,451	32.32
1	175	Pocket Park 7	Park	2.4	0.90	2.16	7.82	6,981	17,451	32.32
1	176	P/QP 1.6	Public/Quasi-Public	1.6	0.50	0.80	2.90	2,585	6,463	11.97
1	183	Paseo 2.3	Paseo	2.3	0.90	2.07	7.49	6,690	16,724	30.97
1	184	Paseo 1.5	Paseo	1.5	0.90	1.35	4.89	4,363	10,907	20.20
1		Streetscapes[3]	Streetscape	65.2	0.44	28.8	104.25	93,071	232,679	430.89
Phase 1 subtotal (without streetscapes)				**216**	**0.58**	**126**	**456**	**407,133**	**1,017,831**	**1,888**
Phase 1 subtotal (with streetscapes)				**281**	**0.55**	**155**	**560**	**500,204**	**1,250,510**	**2,316**
2	100	Park 7.8	Park	7.8	0.90	7.02	25.41	22,687	56,717	105.03
2	101	School 8.1	Public/Quasi-Public	8.1	0.50	4.05	14.66	13,088	32,721	60.59
2	102	CC 4.4	Community Commercial	4.4	0.30	1.32	4.78	4,266	10,665	19.75
2	103	CC 4.9	Community Commercial	4.9	0.30	1.47	5.32	4,751	11,877	21.99
2	104	HDR 5.5	High density residential	5.5	0.40	2.20	7.96	7,110	17,774	32.92
2	105	HDR 5.7	High density residential	5.7	0.40	2.28	8.25	7,368	18,421	34.11
2	106	Park 5.9	Park	5.9	0.90	5.31	19.22	17,160	42,901	79.45
2	135	Park 7.9	Park	7.9	0.90	7.11	25.74	22,978	57,444	106.38
2	136	Middle School 19.9	Public/Quasi-Public	19.9	0.50	9.95	36.02	32,156	80,389	148.87
2	139	Park 4	Park	4	0.90	3.60	13.03	11,634	29,086	53.86
2	140	Church 10.9	Public/Quasi-Public	10.9	0.50	5.45	19.73	17,613	44,032	81.54
2	141	Park 9.6	Park	9.6	0.90	8.64	31.28	27,922	69,805	129.27
2	142	HDR 12.4	High density residential	12.4	0.40	4.96	17.96	16,029	40,073	74.21
2	170	Pocket Park 3a	Park	3	0.90	2.70	9.77	8,726	21,814	40.40
2	172	Pocket Park 3b	Park	3	0.90	2.70	9.77	8,726	21,814	40.40
2	182	Paseo 1.1	Paseo	1.1	0.90	0.99	3.58	3,199	7,999	14.81
2	186	CC 7.2a	Community Commercial	7.2	0.30	2.16	7.82	6,981	17,451	32.32
2	187	CC 7.2b	Community Commercial	7.2	0.30	2.16	7.82	6,981	17,451	32.32
2	192	Paseo 2	Paseo	0	0.90	0.00	0.00	0	0	0.00
2	193	HDR 10	High density residential	10	0.40	4.00	14.48	12,927	32,317	59.85
2		Streetscapes[3]	Streetscape	22.2	0.44	9.7	34.98	31,232	78,081	144.59

Table 3
Recycled Water Customer Demands

Phase	ID Number	Customer Name	Land Use Type	Total Site Area[1] (Acres)	% of Site Area Irrigated[2]	Site Area Irrigated (Acres)	Annual Demand (AFY)	Average Day Demand (GPD)	Peak Day Demand (GPD)	Peak Hour Demand (GPM)
Phase 2 subtotal (without streetscapes)				**139**	**0.56**	**78**	**283**	**252,301**	**630,752**	**1,168**
Phase 2 subtotal (with streetscapes)				**161**	**0.55**	**88**	**318**	**283,533**	**708,832**	**1,313**
3	107	School 8.7	Public/Quasi-Public	8.7	0.50	4.35	15.75	14,058	35,145	65.08
3	108	Park 8.9	Park	8.9	0.90	8.01	29.00	25,886	64,715	119.84
3	119	Regional Park 29.8	Park	29.8	0.90	26.82	97.09	86,675	216,687	401.27
3	120	CC 5.4	Community Commercial	5.4	0.30	1.62	5.86	5,235	13,088	24.24
3	121	HDR 6.9	High density residential	6.9	0.40	2.76	9.99	8,920	22,299	41.29
3	123	Regional Park 91	Park	91	0.90	81.90	296.48	264,678	661,695	1,225.36
3	134	Park 12.1	Park	12.1	0.90	10.89	39.42	35,193	87,984	162.93
3	169	Pocket Park 1	Park	3.2	0.90	2.88	10.43	9,307	23,268	43.09
3	171	Pocket Park 3	Park	3	0.90	2.70	9.77	8,726	21,814	40.40
3	180	Paseo 2.6	Paseo	2.6	0.90	2.34	8.47	7,562	18,906	35.01
3	181	BP 10.5	Business Prof./Light Industrial	10.5	0.30	3.15	11.40	10,180	25,450	47.13
3	185	HDR 8	High density residential	8	0.40	3.20	11.58	10,342	25,854	47.88
3	188	Paseo 1.1	Paseo	1.1	0.90	0.99	3.58	3,199	7,999	14.81
3	189	Paseo 3.0	Paseo	3	0.90	2.70	9.77	8,726	21,814	40.40
3	190	Paseo 0.9	Paseo	0.9	0.90	0.81	2.93	2,618	6,544	12.12
3	191	Paseo 1.1	Paseo	1.1	0.90	0.99	3.58	3,199	7,999	14.81
3		Streetscapes[3]	Streetscape	39.5	0.46	18.2	65.88	58,817	147,043	272.30
Phase 3 subtotal (without streetscapes)				**196**	**0.80**	**156**	**565**	**504,504**	**1,261,261**	**2,336**
Phase 3 subtotal (with streetscapes)				**236**	**0.74**	**174**	**631**	**563,322**	**1,408,304**	**2,608**
4	125	Park 14.1	Park	14.1	0.90	12.69	45.94	41,011	102,526	189.86
4	126	School 7.9	Public/Quasi-Public	7.9	0.50	3.95	14.30	12,765	31,913	59.10
4	127	IND 34.3	Light Industrial	34.3	0.30	10.29	37.25	33,254	83,136	153.96
4	128	LI 35.9	Light Industrial	35.9	0.30	10.77	38.99	34,806	87,014	161.14
4	132	LI 38.3	Light Industrial	38.3	0.30	11.49	41.59	37,133	92,831	171.91
4	177	HDR 9	High density residential	9	0.40	3.60	13.03	11,634	29,086	53.86
4	178	CC 4	Community Commercial	4	0.30	1.20	4.34	3,878	9,695	17.95
4	179	Paseo 0.9	Paseo	0.9	0.90	0.81	2.93	2,617.70	6,544.24	12.12
4		Streetscapes[3]	Streetscape	26.1	0.45	11.7	42.44	37,888	94,721	175.41
Phase 4 subtotal (without streetscapes)				**144**	**0.38**	**55**	**198**	**177,098**	**442,746**	**820**
Phase 4 subtotal (with streetscapes)				**170**	**0.39**	**67**	**241**	**214,987**	**537,467**	**995**
MOU 1	145	Park 10	Park	10	0.90	9.00	32.58	29,086	72,714	134.66
MOU 1	146	HDR 20	High density residential	20	0.40	8.00	28.96	25,854	64,634	119.69
MOU 1	147	CC 13.6	Community Commercial	13.6	0.30	4.08	14.77	13,185	32,964	61.04
MOU 1	148	BR/LI 39.4	Business Prof./Light Industrial	39.4	0.30	11.82	42.79	38,199	95,497	176.85
MOU 1		Streetscapes[3]		18.2	0.46	8.4	30.37	27,112	67,779	125.52
Totals MOU 1 (without streetscapes)				**83**	**0.40**	**33**	**119**	**106,324**	**265,809**	**492**
Totals MOU 1 (with streetscapes)				**101**	**0.41**	**41**	**149**	**133,435**	**333,588**	**618**
MOU 2	149	CC 10	Community Commercial	10	0.30	3.00	10.86	9,695	24,238	44.89
MOU 2	150	School 10	Public/Quasi-Public	10	0.50	5.00	18.10	16,159	40,397	74.81
MOU 2	151	Park 10	Park	10	0.90	9.00	32.58	29,086	72,714	134.66

Table 3
Recycled Water Customer Demands

Phase	ID Number	Customer Name	Land Use Type	Total Site Area[1] (Acres)	% of Site Area Irrigated[2]	Site Area Irrigated (Acres)	Annual Demand (AFY)	Average Day Demand (GPD)	Peak Day Demand (GPD)	Peak Hour Demand (GPM)
MOU 2	152	Park 9.3	Park	9.3	0.90	8.37	30.30	27,050	67,624	125.23
MOU 2	153	CC 14	Community Commercial	14	0.30	4.20	15.20	13,573	33,933	62.84
MOU 2	154	HDR 13.6	High density residential	13.6	0.40	5.44	19.69	17,581	43,951	81.39
MOU 2	155	Park 10.7	Park	10.7	0.90	9.63	34.86	31,121	77,804	144.08
MOU 2	156	School 10	Public/Quasi-Public	10	0.50	5.00	18.10	16,159	40,397	74.81
MOU 2	157	Community Park 123	Park	123	0.90	110.70	400.73	357,752	894,379	1,656.26
MOU 2	158	HDR 21.6	High density residential	21.6	0.40	8.64	31.28	27,922	69,805	129.27
MOU 2	159	Park 10.7	Park	10.7	0.90	9.63	34.86	31,121	77,804	144.08
MOU 2	160	School 10	Public/Quasi-Public	10	0.50	5.00	18.10	16,159	40,397	74.81
MOU 2	161	CC 16.8	Community Commercial	16.8	0.30	5.04	18.24	16,288	40,720	75.41
MOU 2	162	Park 10	Park	10	0.90	9.00	32.58	29,086	72,714	134.66
MOU 2	163	Middle School 25	Public/Quasi-Public	25	0.50	12.50	45.25	40,397	100,991	187.02
MOU 2	164	School 10	Public/Quasi-Public	10	0.50	5.00	18.10	16,159	40,397	74.81
MOU 2	165	Park 12	Park	12	0.90	10.80	39.10	34,903	87,257	161.59
MOU 2	166	BP/LI 10.1	Business Prof./Light Industrial	10.1	0.30	3.03	10.97	9,792	24,480	45.33
MOU 2	167	HDR 23	High density residential	23	0.40	9.20	33.30	29,732	74,330	137.65
MOU 2	168	CC 13.2	Community Commercial	13.2	0.30	3.96	14.34	12,798	31,994	59.25
MOU 2		Streetscapes[3]		37.9	0.46	17.6	63.55	56,737	141,843	262.67
		Totals MOU 2 (without streetscapes)		**373**	**0.65**	**242**	**877**	**782,630**	**1,956,324**	**3,623**
		Totals MOU 2 (with streetscapes)		**411**	**0.63**	**260**	**940**	**839,267**	**2,098,167**	**3,885**

Table 3
Recycled Water Customer Demands

Phase	ID Number	Customer Name	Land Use Type	Total Site Area[1] (Acres)	% of Site Area Irrigated[2]	Site Area Irrigated (Acres)	Annual Demand (AFY)	Average Day Demand (GPD)	Peak Day Demand (GPD)	Peak Hour Demand (GPM)
MOU Transition Areas Only Total (without streetscapes)				456	0.60	275	996	888,853	2,222,133	4,115
MOU Transition Areas Only Total (with streetscapes)				512	0.59	301	1,090	972,702	2,431,756	4,503
WRSP Area Only Total (without streetscapes)				695	0.60	415	1,502	1,341,036	3,352,590	6,209
WRSP Area Only Total (with streetscapes)				847	0.57	483	1,750	1,562,045	3,905,113	7,232
WRSP and MOU Transition Areas Total (without streetscapes)				1,151	0.60	690	2,498	2,229,889	5,574,723	10,324
WRSP and MOU Transition Areas Total (with streetscapes)				1,359	0.58	784	2,839	2,534,748	6,336,869	11,735
			Units	acres			AFY	GPD	GPD	GPM
			Units	acres			AFY	GPD	GPD	GPM

Footnotes
1. "Total Site Area" is the total area (in acres) of each recycled water customer site, as shown on the Admin Draft 3A land use map (see Figures 2 and 3). For all land use areas, including those not irrigated by recycled water, see the matrix on Figure 2.
2. "% of Site Area Irrigated" is the percentage of the "Total Site Area" that is assumed to be landscaped and irrigated with recycled water. Assumed percentages are dexribed in the texxt of the report text. Percentages for streetscapes were calculated based on typical rights-of-way (ROW) widths, median widths, and parkway widths.
3. Recycled water demands for streetscapes were calculated for the landscaped portions of arterial ROWs that contain recycled water pipelines. Landscaping along other roads is not included. It is assumed that the landscaped portion of ROWs will be installed in the same phase as the land uses adjacent to the ROW. Where different phases are shown on both sides of the same ROW, it is assumed that the landscaping will be installed during the earliest of the two phases.

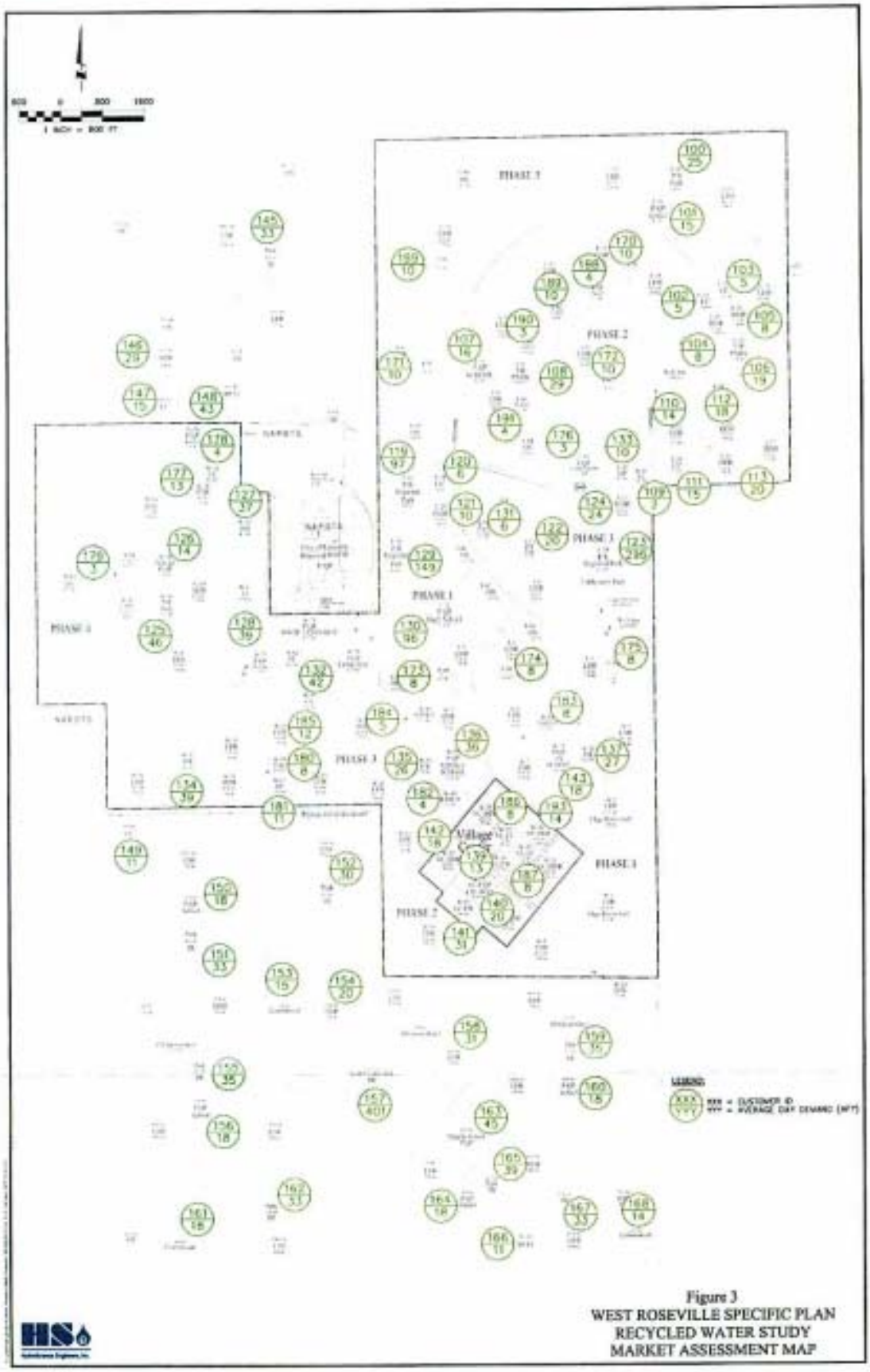


Figure 3
WEST ROSEVILLE SPECIFIC PLAN
RECYCLED WATER STUDY
MARKET ASSESSMENT MAP

Unlike the MWH estimates for recycled water, the MWH estimates for *total* water use presented in the technical memoranda do include detailed breakdowns of water use by land use type. In addition, MWH *total* water use estimates are based partly on actual City water usage data. These estimates account for all water use, including irrigation, but do not distinguish between potable water use and recycled water use. The recycled water demand estimates prepared in this study can be compared against the MWH total water use estimates (by land type) as a check on reasonableness. **Table 4** presents this comparison. The comparison shows good correlation between the recycled water demands estimated in this study for park land use and the total water demand estimates presented in the MWH technical memoranda for the same land uses. It would be expected that nearly all of the water demand for this land use type would be for irrigation and would be met with recycled water supply. In addition, the comparison indicates that between 25 and 50 percent of the total water use for high density residential, commercial, industrial, and public/quasi public land uses would be met by recycled water. The percentage of total demand associated with irrigation at these types of land uses would vary from site to site. However, the irrigation demand estimates (recycled water demands) for these land uses appears reasonable when compared to the total water demand estimates for these land uses.

Note that the "pocket park" areas are counted in the residential land use categories in the Specific Plan and the MWH technical memoranda. Thus, the water demands estimated by MWH for the pocket parks are contained within MWH residential land use demands, not the MWH park land use demands. As a result, recycled water demands calculated for the pocket parks in this study are not included in **Table 4** for comparison with the MWH park land use demands. Similarly, the paseos are classified as open space in the MWH technical memoranda. Similarly, recycled water demands for the paseos estimated in this study are not included in **Table 4** for comparison with the MWH park land use demands. However, pocket parks and paseos will be irrigated with recycled water, and demands are included for these customers in **Table 3.**

Table 4
Percent Recycled Water Demand

Land Use Type	Annual Recycled Water Demand (AFY)	Total Water Demand from MWH Task 7 (AFY)	% of Total Water Demand Met with Recycled Water
Community Commercial / Business Professional	74	270	0.27
High Density Residential	159	517	0.31
Industrial	118	329	0.36
Park (without pocket parks)	818	824	0.99
Park (with pocket parks)	881		
Paseos	47		
Public / Quasi Public	223	503	0.44
Streetscapes	248		
WRSP Total (not including ROW demands)	1,502		
WRSP Total (including ROW demands)	1,750		

Recycled Water Supply

The availability of recycled water supply to the WRSP area is a function of recycled water production, pumping capacity, storage, and existing or priority demands. These parameters are analyzed in this section. Supply and demand must be considered in both the existing City system (Dry Creek WWTP) and the future City system (PGWWTP).

Recycled Water Supply at Dry Creek WWTP

The City prepared recycled water supply estimates when evaluating capacity to supply recycled water to a proposed power plant (Enron). The method used by the City in that analysis is also used to calculate DCWWTP recycled water supply estimates for the years that correspond to phasing of WRSP, as described in the Planning Criteria section.

Equivalent dwelling units (EDUs) for the existing City are estimated in an engineers report that was prepared for the purpose of estimating sewer connection revenues and is considered conservative. Wastewater flow generation was estimated assuming a flow of 200 gallons per day (average) per EDU. Note that this is significantly lower than the flow generation factor of 260 gpd/EDU used in the City's Wastewater Master Plan. However, the lower unit factor results in an estimate of approximately 15 mgd average annual flow to the Dry Creek WWTP. This is similar to adjusted measured flows. As a result, this scenario is considered realistic. In addition, using the lower flow generation factor yields conservative estimates of wastewater generation (on the low side), which becomes recycled water supply. The percentage of the split in flow between the Dry Creek and Pleasant Grove WWTPs is derived from the City's Sewer Master Plan. The estimated recycled water supply at the Dry Creek WWTP is shown in **Table 5**. Average dry weather flow is also shown, since average dry weather flow is representative of flow available during the peak irrigation season.

Existing City Ultimate Recycled Water Demand

The "existing City" ultimate recycled water demand used in this study is 3,211 AFY and includes the customer set described in the Background section of this report. This includes buildout recycled water demands for all areas of the City, other than the WRSP and MOU Transition areas. This "existing City" ultimate demand is similar to the "existing City" ultimate demand of 3,000 AFY developed in the MWH technical memoranda.

Table 5
Dry Creek Wastewater Treatment Plant
Recycled Water Supply

Phase Completion	Year	Total Existing City		Existing City to DCWWTP		
		EDUs	Average Annual Flow (mgd)	Percent to DCWWTP	Average Annual Flow (mgd)	Average Dry Weather Flow (mgd)
0	2002	75,837	15.17	66.7%	10.1	9.3
1	2005	88,269	17.65	68.3%	12.1	11.1
1 - 2	2010	101,754	20.35	54.7%	11.1	10.2
1 - 3	2015	112,094	22.42	54.6%	12.2	11.3
1 - 4	2020	119,069	23.81	54.6%	13.0	12.0
1 - 4 and MOU Areas	2030	131,019	26.20	54.6%	14.3	13.2

Comparison of Existing City Demand to Existing City Supply from DCWWTP

This "existing City" annual demand of 3,211 AFY results in a peak day demand of approximately 7.2 mgd. When compared to the supply available as shown in **Table 5**, it is apparent that the DCWWTP produces enough recycled water by year 2005 to meet this demand. However, due to the low pressure requirement of the existing recycled water system supplied by Dry Creek WWTP (see Background section), the comparison of supply to demand in the Dry Creek WWTP system must include an evaluation of pumping capacity at the Dry Creek WWTP recycled water pump station. The existing City recycled water model was run using the "existing City" ultimate recycled water demand of 3,211 AFY. The model was run using an "extended period simulation" that calculates hourly hydraulic results over a 24-hour period. The model simulates hourly peak flow conditions during the peak irrigation season. The model results indicated that the Dry Creek WWTP recycled water pump station cannot meet the fill requirements for the existing tank in the Dry Creek system, under this ultimate flow scenario, due to the limited head condition imposed by the low pressure requirement. As a result, approximately 700 gpm of constant supply is required from the Pleasant Grove WWTP to the storage tank in the Dry Creek system during peak season conditions. With the added continuous supply of 700 gpm from Pleasant Grove WWTP, the storage tank could meet the hourly peaking requirements simulated in the model.

Recycled Water Supply at Pleasant Grove WWTP

Using the same method described above to estimate recycled water supply from the Dry Creek WWTP, flows from the existing City to the Pleasant Grove WWTP were estimated. In addition, contributing wastewater flows were estimated from the WRSP phased area as well. These estimated demands are shown in **Table 6**. The same unit factor used to estimate wastewater generation in the existing City (200 gpd per EDU) was used to estimate the wastewater generation in the WRSP area.

Table 6
Pleasant Grove Wastewater Treatment Plant
Recycled Water Supply

Phase Completion	Year	Total Existing City		Existing City To PGWWTP		West Roseville Specific Plan		Total Flow To PGWWTP	
		EDUs	Average Annual Flow (mgd)	Percent to PGWWTP	Average Annual Flow (mgd)	DUs from Phasing Plan	Average Annual Flow (mgd)	Average Annual Flow (mgd)	Average Dry Weather Flow (mgd)
0	2002	75,837	15.17	33.3%	5.1	0	0.0	5.1	4.7
1	2005	88,269	17.65	31.7%	5.6	2,807	0.6	6.2	5.7
1 - 2	2010	101,754	20.35	45.3%	9.2	5,494	1.1	10.3	9.5
1 - 3	2015	112,094	22.42	45.4%	10.2	7,505	1.5	11.7	10.7
1 - 4	2020	119,069	23.81	45.4%	10.8	8,430	1.7	12.5	11.5
1 - 4 and MOU Areas	2030	131,019	26.20	45.4%	11.9	15,453	3.1	15.0	13.8

Footnotes
1. Wastewater generation for WRSP calculated using unit flow factor of 200 gpd per DU.

Power Plant Demands

Enron provided recycled water demand estimates to the City. Enron anticipated that the power plant would have a capacity of 750 – 900 Megawatts. At the time of preparation of this report, it is believed that the Enron plant originally envisioned will not be constructed. As a result, this recycled water study does not assess the recycled water supply and demand requirements for the original facility envisioned by Enron. However, it is possible that a smaller facility may be constructed sometime in the future. The City of Roseville is currently considering constructing a power plant with a capacity of 100 – 150 Megawatts. The City expects the power plant would be constructed by 2005 or 2006.

For purposes of completing this study, two scenarios are considered and assessed in this study: no power plant and 150 Megawatt power plant. 150 Megawatts is the largest plant envisioned by the City. Also, it is assumed that the power plant would be online in 2005, which is the earliest date projected by the City. It is assumed that the recycled water demand for a 150 Megawatt power plant would be 20 percent of the demand estimated by Enron for the 750 Megawatt plant previously proposed (150 Megawatts / 750 Megawatts = 0.20). The demands assumed for these two scenarios are summarized in **Table 7** below.

Table 7 • Power Plant Demand Scenarios

Scenario	Total Annual Demand (AFY)	Peak Day Demand (MGD)
Original Enron Plant (not evaluated)	5,562	7.26
Scenario 1: No Power Plant	0	0
Scenario 2: 150 Megawatt Power Plant	1,112	1.45

Comparison of Supply and Demand at Pleasant Grove WWTP

Tables 8 and **9** present a comparison of supply and demand at the Pleasant Grove WWTP system for both annual average and peak day conditions. First the total availability of recycled water supply from the Pleasant Grove WWTP is shown. Then the supplementary demand required at the Dry Creek WWTP is subtracted, and the remainder is shown as the availability of recycled water to the WRSP area. The final column shows the excess recycled water supply available to other City projects, such as a power plant project, after the WRSP demands and system losses are subtracted. As shown in **Tables 8 and 9**, adequate supply of recycled water is available to the WRSP project during all phases, annually and during the peak month. In addition, adequate supply of recycled water is available for other City projects (annually and during peak month), such as a 150 Megawatt power plant.

Table 8
Water Supply and Demand Comparisons (Average Day Conditions)

Phases Completed[1]	Estimated Year	Total Average Annual Supply From PGWWTP[2] (MGD)	Average Annual Supplement To Dry Creek Tank[3] (MGD)	Average Annual Supply Available To WRSP[4] (MGD)	Average Annual Demand At WRSP[5] (MGD)	2% System Losses At WRSP (AFY) (MGD)	Average Annual Supply Available For Other City Projects (MGD)
1	2005	6.2	0.40	5.75	0.50	0.01	5.24
1 and 2	2010	10.3	0.40	9.92	0.78	0.02	9.12
1, 2, and 3	2015	11.7	0.40	11.27	1.35	0.03	9.90
1, 2, 3, and 4	2020	12.5	0.40	12.09	1.56	0.03	10.49
1, 2, 3, 4, and MOU Areas	2030	15.0	0.40	14.58	2.53	0.05	11.99

Footnotes
1. Each row in this table corresponds to estimated average day conditions at the time of completion of the phases indicated. This table reflects supply and emand conditions on an annual basis.
2. "Total Average Annual Supply From PGWWTP" is obtained from Table 6 (see column "Average Annual Flow" under heading "Total Flow To PGWWTP").
3. "Average Annual Supplement to Dry Creek Tank" is calculated by dividing the estimated peak day requirement of 700 gpm (1.0 mgd) by the peak day factor of 2.5.
4. "Average Annual Supply Available To WRSP" is calculated by subtracting the "Average Annual Supplement To Dry Creek Tank" from the "Total Average Annual Supply From PGWWTP".
5. "Average Annual Demand At WRSP" includes streetscapes and is obtained from Table 3. See the "Average Day Demand" subtotals for each phase (with streetscapes) in Table 3. For example, the Average Annual Demand of 1.56 MGD shown for completed phases 1 through 4 is the sum of the "Average Day Demand" subtotals (with streetscapes) for each of the four phases, expressed in units "MGD".

Table 9
Water Supply and Demand Comparisons (Peak Day Conditions)

Phases Completed[1]	Estimated Year	Total Peak Day Supply From PGWWTP[2] (MGD)	Peak Day Demand to Dry Creek Tank[3] (MGD)	Peak Day Supply Available to WRSP[4] (MGD)	Peak Day Demand At WRSP[5] (MGD)	2% System Loss at WRSP (MGD)	Peak Day Supply Available For Other City Projects (MGD)
1	2005	5.7	1.0	4.7	1.25	0.03	3.4
1 - 2	2010	9.5	1.0	8.5	1.96	0.04	6.5
1 - 3	2015	10.7	1.0	9.7	3.37	0.07	6.3
1 - 4	2020	11.5	1.0	10.5	3.91	0.08	6.5
1 - 4 and MOU Areas	2030	13.8	1.0	12.8	6.34	0.13	6.3

Footnotes
1. Each row in this table corresponds to estimated peak day conditions at the time of completion of the phases indicated. This table reflects supply and demand conditions during the peak irrigation season.
2. "Total Peak Day Supply From PGWWTP" is obtained from Table 6 (see column "Average Dry Weather Flow" under heading "Total Flow To PGWWTP"). "Average Dry Weather Flow" is used because peak irrigation conditions occur when WWTP flows correspond to dry weather conditions.
3. "Peak Day Demand to Dry Creek Tank" is the continuous flow of 700 gpm to the Dry Creek Tank during the peak season. It is assumed that this flow occurs continuously over a 24-hour period during the peak season.
4. "Peak Day Supply Available To WRSP" is calculated by subtracting the "Peak Day Supplement To Dry Creek Tank" from the "Total Peak Day Supply From PGWWTP".
5. "Peak Day Demand At WRSP" includes streetscapes and is obtained from Table 3. See the "Peak Day Demand" subtotals for each phase (with streetscapes) in Table 3. For example, the Peak Day Demand of 3.91 MGD shown for completed phases 1 through 4 is the sum of the "Peak Day Demand" subtotals (with streetscapes) for each of the four phases, expressed in units "MGD".

WRSP Operational Storage Requirements

Hourly water balances (**Tables 10** and **11**) were used to estimate operational storage requirements to meet hourly peak flow rates for each phase at the WRSP. First, hourly recycled water production flow rates were calculated for each phase of WRSP, in gallons per minute, by applying diurnal peaking factors to the average dry weather flow rates shown in **Table 9** for the Pleasant Grove WWTP. The diurnal curve used in this study is the same diurnal curve used in the Feasibility Study. This diurnal curve was developed from Dry Creek WWTP influent flow data, under dry weather conditions. Next, other City demands, such as the hourly tank fill requirements at the power plant and the Dry Creek system, were subtracted from the hourly recycled water production flow rates. The differences are shown in the water balances as the "supply" hourly flow rates available to WRSP.

Peak hour demand estimates are shown in **Table 3**. In the water balances shown in **Tables 10** and **11**, the peak hour demand flow rates for each phase were applied during a 9-hour irrigation period starting at 9:00 pm and ending at 6:00 am (same as in Feasibility Study). In addition, peak hour demand flow rates for each phase were adjusted to account for the assumed 2 percent distribution system loss factor (see Criteria). The 2 percent distribution system loss factor was calculated by multiplying the peak day demand by 0.02, and then averaging the result over 24 hours. The sum of all of the peak hourly "demand" flow rates is equivalent to the peak day demand (plus 2 percent loss factor) shown in **Table 9** for each phase.

As highlighted in **Tables 10** and **11**, for each phase there is a "deficit period" during which the recycled water demand exceeds the recycled water supply. The difference between the total "demand" and the total "supply" during this period represents the amount of recycled water that must be supplied by an operational storage facility. A 30 percent safety factor was added to the total required storage volume to account for fluctuations in the irrigation cycle. **Tables 10** and **11** also show the volume of water in the storage tank for each hour of the water balance.

The water balance was prepared for two scenarios: no power plant scenario and 150 Megawatt power plant scenario. Each scenario is described below.

<u>No Power Plant Scenario</u>

Under the No Power Plant scenario, it was assumed that the Pleasant Grove WWTP would first provide the supplementary peak day demand of 700 gpm required at the Dry Creek Tank, as estimated previously in this study. This flow rate would be provided continuously over a 24-hour period during seasonal peak conditions. In the water balance for this scenario, 700 gpm is subtracted from the hourly recycled water supply flow rates to account for this demand. The remainder of the recycled water supply would be available to meet demands at WRSP. The water balance and storage requirements for the No Plant Scenario are shown in **Table 10**.

Estimates of required operational storage vary from 0.28 to 1.22 million gallons for Phases 1 through 4. When the estimated demands for the MOU area are added to the demands for Phases 1 through 4, the estimated required volume for operational storage is 3.14 million gallons. For purposes of this study and for sizing of conveyance facilities, it is assumed that the storage required to meet MOU peak demands will be added at the same storage site used for Phases 1 through 4 of the WRSP. Sequencing of the construction of storage facilities for the various phases and MOU area is not considered in this study but will be considered in future phasing plans.

150 Megawatt Power Plant Scenario

For this scenario, it was assumed that the City would first provide the supplementary peak day demand of 700 gpm to the Dry Creek Tank, as described above for the No Power Plant scenario. In addition, it was assumed that the City would provide a continuous supply of 1,008 gpm to the 150 Megawatt power plant to meet the estimated peak day demand of 1.45 MGD. The remainder of the recycled water supply would be available to meet demands at WRSP. The water balance and storage requirements for WRSP under this scenario are shown in **Table 11**. Estimates of required operational storage for the WRSP vary from 0.65 to 1.70 million gallons for Phases 1 through 4. When the estimated demands for the MOU area are added to the demands for Phases 1 through 4, the estimated total required volume for operational storage is 3.85 million gallons. For purposes of this study and for sizing of conveyance facilities, it is assumed that the storage required to meet MOU peak demands will be added at the same storage site used for Phases 1 through 4 of the WRSP. Sequencing of the construction of storage facilities for the various phases and MOU area is not considered in this study but will be considered in future phasing plans.

The storage capacity requirements estimated above do not include any storage required at the power plant. It is assumed that the power plant would construct its own storage tank to meet its operational peaking requirements. The volume of storage required at the power plant to meet its hourly peaking requirements depends on the operational characteristics of the future power plant, which are unknown at this time.

Table 10
WRSP Operational Storage Evaluation
(No Power Plant Scenario)

Adjustments to Supply
Constant Flow to Dry Creek System Storage Tank -700 gpm
Constant Flow to Power Plant Storage Tank: 0 gpm

	Phase 1			Phase 1 - 2			Phase 1 - 3			Phase 1 - 4			Phase 1 - 4 and MOU			
Hour	Supply (gpm)	Demand (gpm)	Storage Vol (gallons)	Supply (gpm)	Demand (gpm)	Storage Vol. (gallons)	Supply (gpm)	Demand (gpm)	Storage Vol. (gallons)	Supply (gpm)	Demand (gpm)	Storage Vol. (gallons)	Supply (gpm)	Demand (gpm)	Storage Vol. (gallons)	
12:00 AM	3,185	2,333	279,307	5,817	3,656	269,547	6,669	6,283	949,352	7,186	7,286	1,217,923	8,757	11,823	2,730,040	
1:00 AM	2,737	2,333	279,307	5,067	3,656	269,547	5,821	6,283	921,634	6,278	7,286	1,157,455	7,669	11,823	2,480,780	
2:00 AM	2,123	2,333	266,676	4,035	3,656	269,547	4,655	6,283	823,932	5,030	7,286	1,022,099	6,172	11,823	2,141,710	
3:00 AM	1,536	2,333	218,832	3,051	3,656	233,251	3,541	6,283	659,427	3,839	7,286	815,261	4,743	11,823	1,716,913	
4:00 AM	1,117	2,333	145,836	2,347	3,656	154,760	2,746	6,283	447,207	2,988	7,286	557,363	3,722	11,823	1,230,882	
5:00 AM	977	2,333	64,456	2,113	3,656	62,203	2,481	6,283	219,081	2,704	7,286	282,445	3,382	11,823	724,440	
6:00 AM	1,172	17	133,759	2,441	27	207,043	2,852	47	387,406	3,101	54	465,256	3,859	88	950,670	
7:00 AM	1,871	17	244,982	3,613	27	269,547	4,178	47	635,257	4,519	54	733,167	5,559	88	1,278,956	
8:00 AM	2,765	17	279,307	5,114	27	269,547	5,874	47	949,352	6,335	54	1,110,004	7,737	88	1,737,874	
9:00 AM	3,967	17	279,307	7,130	27	269,547	8,154	47	949,352	8,774	54	1,223,928	10,662	88	2,372,330	
10:00 AM	5,085	17	279,307	9,005	27	269,547	10,275	47	949,352	11,044	54	1,223,928	13,384	88	3,139,238	
11:00 AM	5,448	17	279,307	9,614	27	269,547	10,964	47	949,352	11,781	54	1,223,928	14,268	88	3,139,238	
12:00 PM	5,253	17	279,307	9,266	27	269,547	10,593	47	949,352	11,384	54	1,223,928	13,792	88	3,139,238	
1:00 PM	4,722	17	279,307	8,395	27	269,547	9,585	47	949,352	10,306	54	1,223,928	12,499	88	3,139,238	
2:00 PM	4,191	17	279,307	7,505	27	269,547	8,578	47	949,352	9,228	54	1,223,928	11,207	88	3,139,238	
3:00 PM	3,716	17	279,307	6,708	27	269,547	7,677	47	949,352	8,264	54	1,223,928	10,050	88	3,139,238	
4:00 PM	3,352	17	279,307	6,098	27	269,547	6,988	47	949,352	7,526	54	1,223,928	9,165	88	3,139,238	
5:00 PM	3,045	17	279,307	5,582	27	269,547	6,404	47	949,352	6,902	54	1,223,928	8,417	88	3,139,238	
6:00 PM	2,933	17	279,307	5,395	27	269,547	6,192	47	949,352	6,675	54	1,223,928	8,145	88	3,139,238	
7:00 PM	3,073	17	279,307	5,629	27	269,547	6,457	47	949,352	6,959	54	1,223,928	8,485	88	3,139,238	
8:00 PM	3,492	17	279,307	6,333	27	269,547	7,253	47	949,352	7,810	54	1,223,928	9,506	88	3,139,238	
9:00 PM	3,911	2,333	279,307	7,036	3,656	269,547	8,048	6,283	949,352	8,661	7,286	1,223,928	10,526	11,823	3,061,432	
10:00 PM	4,051	2,333	279,307	7,270	3,656	269,547	8,313	6,283	949,352	8,945	7,286	1,223,928	10,866	11,823	3,004,037	
11:00 PM	3,827	2,333	279,307	6,895	3,656	269,547	7,889	6,283	949,352	8,491	7,286	1,223,928	10,322	11,823	2,913,985	
Total (MG)	4.65	1.28		8.49	2.00		9.73	3.43		10.48	3.98		12.77	6.46		MG
Deficit Period[3] (MG)	0.35	0.56		0.45	0.66		1.15	1.88		1.68	2.62		3.97	6.38		MG
Supply req. from storage (MG):			0.21			0.21			0.73			0.94			2.41	MG
30% safety factor (MG):			0.06			0.06			0.22			0.28			0.72	MG
Total Storage (MG):			**0.28**			**0.27**			**0.95**			**1.22**			**3.14**	MG

Footnotes
1. "Supply" hourly flow rates are calculated by subtracting the flow rates listed under "Adjustments to Supply" from the estimated hourly production rates at the Pleasant Grove WWTP (based on average dry weather conditions and the Roseville diurnal curve).
2. "Demand" hourly flow rates include the peak hour flow rates shown in Table 3 plus an adjustment for the 2 percent loss factor. The sum of the demand hourly flow rates equals the peak day demand plus the loss factor shown in Table 9.
3. "Deficit period" is the period during which the hourly demand exceeds the hourly supply. This period is shaded and boxed in each of the demand columns.
4. "Storage Volume" indicates the volume of water in the tank at the hour indicated, up to the full storage capacity of the tank (tank full condition).

Table 11
WRSP Operational Storage Evaluation
(150 Megawatt Power Plant Scenario)

Adjustments to Supply
Constant Flow to Dry Creek System Storage Tank: -700 gpm
Constant Flow to Power Plant Storage Tank: -1,008 gpm (1.45 MGD)

	Phase 1			Phase 1 - 2			Phase 1 - 3			Phase 1 - 4			Phase 1 - 4 and MOU			
Hour	Supply (gpm)	Demand (gpm)	Storage Vol. (gallons)	Supply (gpm)	Demand (gpm)	Storage Vol. (gallons)	Supply (gpm)	Demand (gpm)	Storage Vol (gallons)	Supply (gpm)	Demand (gpm)	Storage Vol (gallons)	Supply (gpm)	Demand (gpm)	Storage Vol. (gallons)	
12:00 AM	2,175	2,333	641,862	4,808	3,656	554,558	5,661	6,283	1,353,826	6,177	7,286	1,629,350	7,749	11,823	3,195,921	
1:00 AM	1,728	2,333	605,533	4,058	3,656	554,558	4,813	6,283	1,265,603	5,270	7,286	1,508,378	6,660	11,823	2,886,157	
2:00 AM	1,113	2,333	532,315	3,027	3,656	516,831	3,646	6,283	1,107,397	4,022	7,286	1,312,519	5,163	11,823	2,486,583	
3:00 AM	526	2,333	423,884	2,042	3,656	420,031	2,533	6,283	882,389	2,830	7,286	1,045,176	3,735	11,823	2,001,281	
4:00 AM	107	2,333	290,302	1,339	3,656	281,035	1,738	6,283	609,665	1,979	7,286	726,774	2,714	11,823	1,454,747	
5:00 AM	0	2,333	150,314	1,105	3,656	127,975	1,473	6,283	321,035	1,696	7,286	391,352	2,374	11,823	887,800	
6:00 AM	163	17	159,031	1,433	27	212,310	1,844	47	428,856	2,093	54	513,659	2,850	88	1,053,526	
7:00 AM	861	17	209,667	2,605	27	366,971	3,169	47	616,203	3,511	54	721,066	4,551	88	1,321,309	
8:00 AM	1,756	17	313,961	4,105	27	554,558	4,866	47	905,344	5,326	54	1,037,399	6,728	88	1,719,723	
9:00 AM	2,957	17	490,357	6,121	27	554,558	7,146	47	1,331,271	7,766	54	1,500,103	9,654	88	2,293,674	
10:00 AM	4,075	17	651,361	7,997	27	554,558	9,266	47	1,391,152	10,035	54	1,695,859	12,375	88	3,030,916	
11:00 AM	4,438	17	651,361	8,606	27	554,558	9,955	47	1,391,152	10,773	54	1,695,859	13,260	88	3,821,226	
12:00 PM	4,243	17	651,361	8,278	27	554,558	9,584	47	1,391,152	10,376	54	1,695,859	12,784	88	3,847,135	
1:00 PM	3,712	17	651,361	7,387	27	554,558	8,577	47	1,391,152	9,298	54	1,695,859	11,491	88	3,847,135	
2:00 PM	3,181	17	651,361	6,496	27	554,558	7,570	47	1,391,152	8,220	54	1,695,859	10,198	88	3,847,135	
3:00 PM	2,706	17	651,361	5,699	27	554,558	6,668	47	1,391,152	7,255	54	1,695,859	9,042	88	3,847,135	
4:00 PM	2,342	17	651,361	5,090	27	554,558	5,979	47	1,391,152	6,518	54	1,695,859	8,157	88	3,847,135	
5:00 PM	2,035	17	651,361	4,574	27	554,558	5,396	47	1,391,152	5,894	54	1,695,859	7,409	88	3,847,135	
6:00 PM	1,923	17	651,361	4,386	27	554,558	5,184	47	1,391,152	5,667	54	1,695,859	7,136	88	3,847,135	
7:00 PM	2,063	17	651,361	4,621	27	554,558	5,449	47	1,391,152	5,951	54	1,695,859	7,477	88	3,847,135	
8:00 PM	2,462	17	651,361	5,324	27	554,558	6,244	47	1,391,152	6,802	54	1,695,859	8,497	88	3,847,135	
9:00 PM	2,901	2,333	651,361	6,027	3,656	554,558	7,040	6,283	1,391,152	7,653	7,286	1,695,859	9,518	11,823	3,708,825	
10:00 PM	3,041	2,333	651,361	6,262	3,656	554,558	7,305	6,283	1,391,152	7,936	7,286	1,695,859	9,858	11,823	3,590,926	
11:00 PM	2,818	2,333	651,361	5,887	3,656	554,558	6,880	6,283	1,391,152	7,482	7,286	1,695,859	9,314	11,823	3,440,369	
Total (MG)	3.20	1.28		7.04	2.00		8.28	3.43		9.03	3.98		11.32	6.46		MG
Deficit Period[3] (MG)	0.34	0.84		0.45	0.88		1.19	2.26		1.32	2.62		3.43	6.38		MG
Supply req. from storage (MG):			0.50			0.43			1.07			1.30			2.96	MG
30% safety factor (MG):			0.15			0.13			0.32			0.39			0.89	MG
Total Storage (MG):			**0.65**			**0.55**			**1.39**			**1.70**			**3.85**	**MG**

Footnotes
1. "Supply" hourly flow rates are calculated by subtracting the flow rates listed under "Adjustments to Supply" from the estimated hourly production rates at the Pleasant Grove WWTP (based on average dry weather conditions and the Roseville diurnal curve).
2. "Demand" hourly flow rates include the peak hour flow rates shown in Table 3 plus an adjustment for the 2 percent loss factor. The sum of the demand hourly flow rates equals the peak day demand plus the loss factor shown in Table 9.
3. "Deficit period" is the period during which the hourly demand exceeds the hourly supply. This period is shaded and boxed in each of the demand columns.
4. "Storage Volume" indicates the volume of water in the tank at the hour indicated, up to the full storage capacity of the tank (tank full condition).

System Description and Hydraulic Modeling

The system was modeled using Cybernet version 3.5 and AutoCAD 2000. Pipeline alignments were located in arterial roads to provide a backbone distribution system to the customers shown in **Figure 3**. One storage reservoir was modeled at the proposed tank site just north of the Pleasant Grove WWTP. In addition, a single pump station was modeled immediately downstream of the modeled storage reservoir. The storage reservoir would be a tank or series of tanks that equal the required storage volume. It is assumed that the pump station will also be located at the proposed reservoir site. This pump station would pressurize the distribution system for the WRSP and MOU Transition Areas. This pump station is separate from any pumping capacity already constructed at the PGWWTP. It is assumed that the City would use the existing pump station at the PGWWTP to pump recycled water to the WRSP storage tank and to any other storage tanks for other projects, such as a power plant.

The hydraulic model was run under peak hourly flow conditions. Minimum pipeline diameters were selected that achieve the pressure and velocity criteria described previously in this study. Capacity was provided in the backbone distribution system to convey the required 700 gpm from the PGWWTP to the intersection of Fiddyment and Del Webb Boulevard, near the existing Sewer Pump Station 5. Elevations were selected for each junction node using a preliminary topography map provided by Wood Rodgers. The model was run under two demand scenarios: WRSP with MOU transition areas and WRSP without MOU transition areas. Each scenario is described below.

WRSP With MOU Transition Areas Model Scenario

For this scenario, demands were included for all customers shown in **Table 3**, including the MOU transition areas. Pipelines were not included for the MOU transition areas; however, MOU transition area demands were located at corresponding boundary junction nodes.

The hydraulic model for WRSP (including demands for the MOU area) is shown on **Figure 4**. Pipeline diameters are color-coded. In addition, pressures at junction nodes are annotated. The system was modeled using a pump with a design point of 11,900 gpm at a pump head of 171 feet. This pumping capacity is adequate to provide the required 700 gpm to the storage tank at the Dry Creek system, once the City interconnects the systems by converting the existing 18-inch sewer force main described previously. Under peak hour flow conditions, junction node pressures vary from approximately 40 psi to 70 psi.

This model represents the recycled water distribution system that would be constructed by the end of Phase 4. The pipelines in this system would have capacity for the future MOU recycled water demands. In addition, the pump station shown in the model would have capacity to supply the future MOU area. However, **Figure 4** does not represent phased construction. It is expected

that construction of recycled water facilities would be phased in accordance with the project phases. In addition, it is expected that storage and pumping facilities could be constructed in phases as well. Some facilities, such as the pipeline from the plant to the storage tank and pump station, would likely be constructed out of phase with the rest of the project, as required to convey water to the early phases of the project. Phased construction of pipeline, pumping, and storage facilities will be addressed in a separate phasing plan.

Pipeline Diameters Affected By Dry Creek Tank Fill Requirement

As described above, the model includes a constant flow of 700 gpm to the existing City storage tank in the Dry Creek system. This flow affects the size of the pipelines shown in Hayden Parkway (Pipes P-3078, P-3077, P-3080, and P-3079 on **Figure 4**). With the 700 gpm demand included, the required diameter is 24-inch for pipelines in Hayden Parkway between Blue Oaks Boulevard and Bob Doyle Drive (pipes P-3078 and P-3077), and 18-inch for pipelines in Hayden Parkway between Bob Doyle Drive and Fiddyment Road (pipes P-3080 and P-3079). However, if the 700 gpm demand is not included, the 24-inch diameter pipelines in Hayden Parkway can be reduced to 20-inch diameter pipelines, and the 18-inch diameter pipelines in Hayden Parkway can be reduced to 16-inch diameter.

WRSP Without MOU Transition Areas Model Scenario

This scenario represents a hypothetical recycled water system without the MOU transition area demands. This scenario is provided to allow development of incremental costs that are associated with the MOU Transition areas. This scenario is shown of **Figure 5**. This scenario was modeled using a pump with a design point of 11,900 gpm at a pump head of 148 feet.

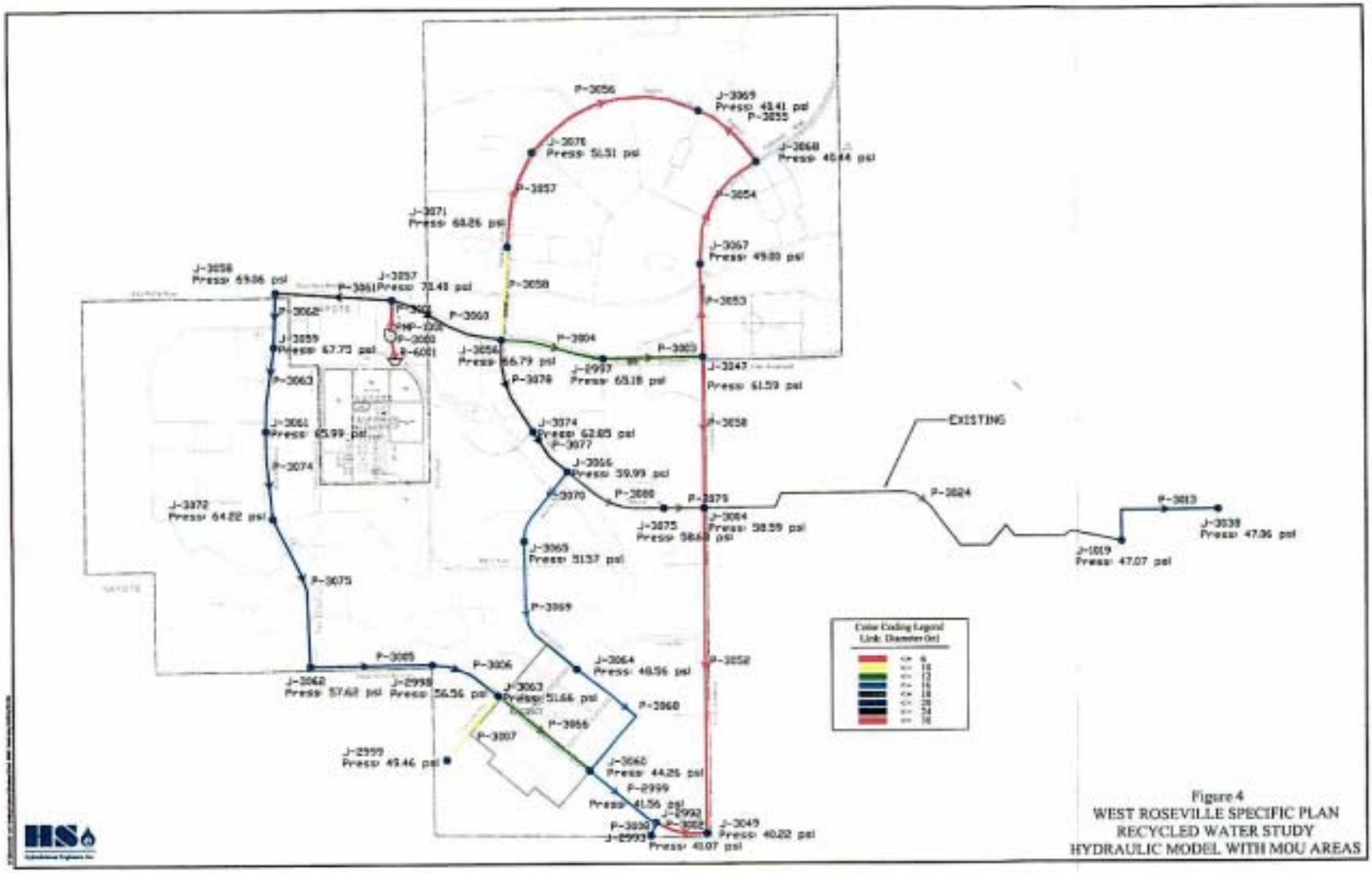


Figure 4
WEST ROSEVILLE SPECIFIC PLAN
RECYCLED WATER STUDY
HYDRAULIC MODEL WITH MOU AREAS

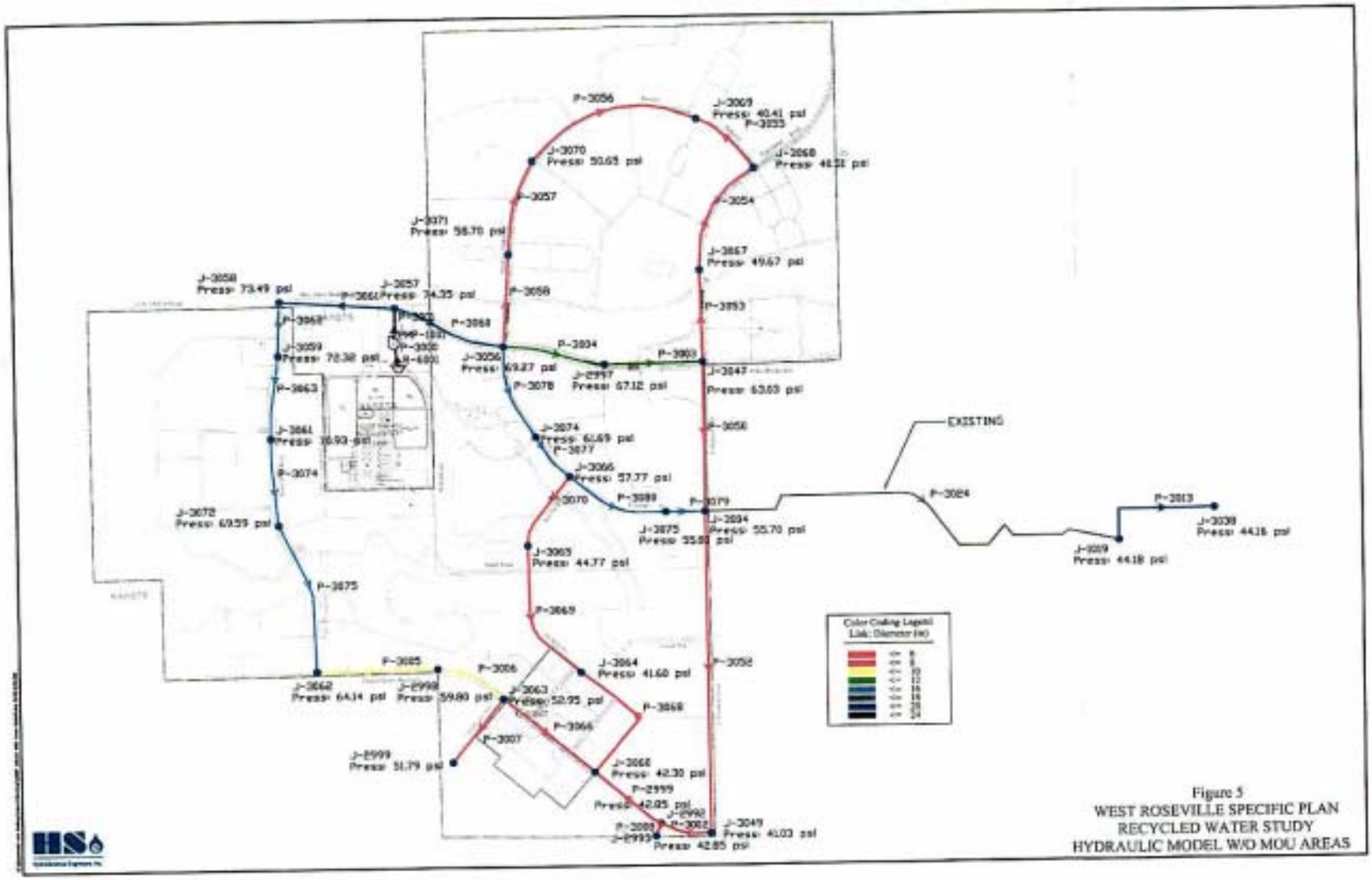


Figure 5
WEST ROSEVILLE SPECIFIC PLAN
RECYCLED WATER STUDY
HYDRAULIC MODEL W/O MOU AREAS

Responses to

CEC Staff Data Requests

Data Requests 58-62: Transmission System Engineering

Application for Certification

for the

Roseville Energy Park

Roseville, California

03-AFC-01

Submitted by

Roseville Electric

February 2004

Detailed Facility Study

58 *Please provide a Detailed Facility Study for the selected 60 kV connection option. Analyze the system impact, including scenarios both with and without the West Roseville Specific Plan (WRSP) and with and without the proposed project during peak and off peak system conditions which will demonstrate conformance or non-conformance with the reliability and planning criteria with the following provisions:*

Response: The DFS is found at the end of this section as Attachment TE-1.

a. Identify major assumptions in the base cases including imports to the system, major generation and load changes in the system and queue generation.

Response: See the page 2 of the DFS (Attachment TE-1).

b. Analyze the system for N-0, important N-1 and critical N-2 contingency conditions and provide a list of criteria violations in a table showing the loadings before and after adding the new generation.

Response: See "Power Flow Results" pages 4-6 of the DFS (Attachment TE-1).

c. Short circuit studies. Identify all equipment analyzed, interrupting current, current interrupting rating, and required interrupting rating due to the project.

Response: See the page 10 of the DFS (Attachment TE-1).

d. Analyze the system for Transient Stability and Post-transient voltage conditions under critical N-1 and N-2 contingencies, and provide related plots, switching data and a list of voltage violations in the study.

Response: See "Dynamic Facility Studies," page 9 of the DFS (Attachment TE-1).

e. Identify the reliability and planning criteria utilized to determine the criteria violations.

Response: See "Study Criteria," page 9 of the DFS (Attachment TE-1).

f. Provide a list of contingencies evaluated for each study..

Response: See the outage list attached (Attachment TE-2).

g. Provide power flow diagrams (MW, percent loading & per unit voltage) for base cases with and without the project. Power flow diagrams must also be provided for all N-0, N-1 and N-2 studies where overloads or voltage violations appear.

Response: See the pages 11-21 of the DFS (Attachment TE-1).

h. List the mitigation measures considered and those selected for all criteria violations.

Response: The DFS contains only one element, the Elverta-Hurley 1 & 2 line, that is negatively affected by the addition of the REP. Western Area Power Administration states in the DFS that they are in the process of re-rating this line and that the re-rating of this line will eliminate any overload condition under this particular N-1 condition.

*i. Provide electronic copies of *.sav and *.drw Positive Sequence Load Flow files.*

Response: Electronic copies of the *.sav and *.drw files have been provided to CEC Staff on a CD-ROM.

One-line diagram

59 Please provide a one-line diagram for the 60 kV connection of the proposed project including the configuration without the WRSP.

Response: See the attached one-line diagrams for with-WRSP and without-WRSP cases (Attachment TE-3).

Conductor size

60 Please provide the conductor size for the outlet circuits which connect the proposed project to the transmission system.

Response: See the DFS, page 4 (Attachment TE-1).

Percent loading with WRSP

61 Please clarify the information on page 18 of the Supplement in Response to Data Adequacy Comments. The table shows percent loading with and without the proposed project for both 2006 and 2010. Is the WRSP included in these studies?

Response: The WRSP was included in these studies.

T121 operating procedures

62 What are the T121 operating procedures identified to mitgate criteria violations on page 18 of the data adequacy supplement? Please provide a copy of the T121 operating procedure.

Response: Staff has requested withdrawal of this data request as of January 30, 2004.

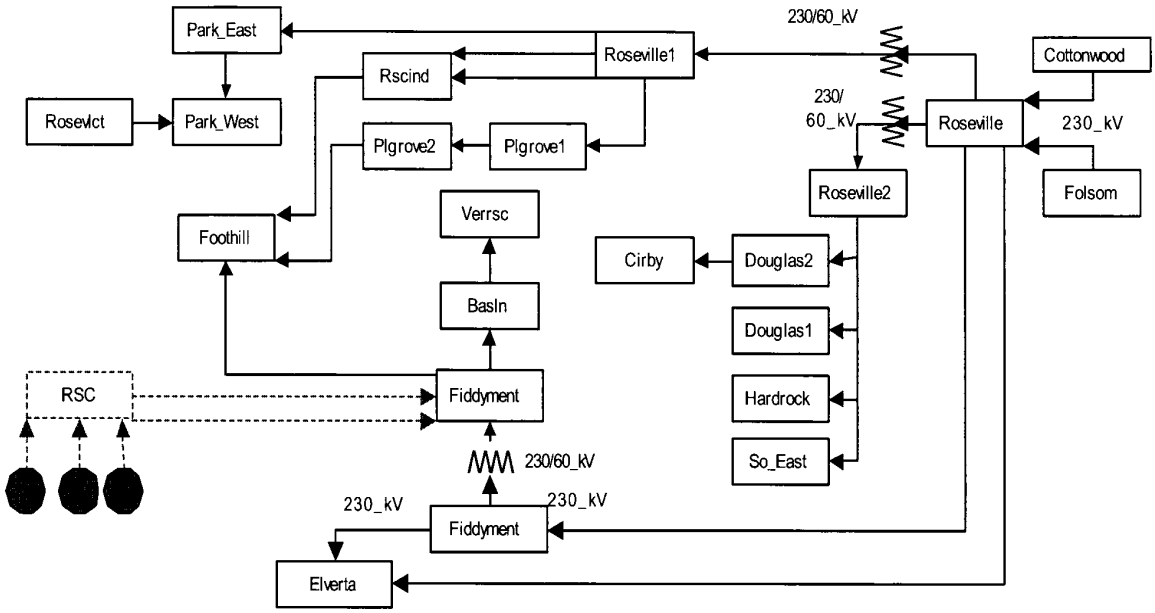
ATTACHMENT TE-1

Detailed Facilities Study

ROSEVILLE ENERGY PARK

POWER GENERATION FACILITY

DETAILED FACILITY STUDY



PREPARED BY

WESTERN AREA POWER ADMINISTRATION
SIERRA NEVADA REGION

December 16, 2003

Executive Summary

This report summarizes the results of Western Area Power Administration's Detailed Facility Study, performed in response to the City of Roseville's (City) request to assess the impact of adding 160 MW of generation at Roseville Energy Park (REP). Previously, Western conducted a screening study and the result of that study was published in June 2003 report. REP will be located on a 40-acre city site adjacent to the Pleasant Grove Wastewater Treatment Plant, about one mile west of the City's existing contiguous limits. This site is located approximately four miles north of Fiddyment Substation. See Figure 1.1-2

The addition of REP was studied using a 2006 Heavy Summer base case with the City's load forecast at 320 MW. The REP project consists of adding the 160 MW of generation with a double circuit connection to the Fiddyment 60-kV Substation. See Figure 2

Summary of Findings:

The Western Electric Coordinating Council (WECC) and the North American Electric Reliability Council (NERC) planning criteria were used to evaluate the impact of the REP generation project.

The overloads which appeared in the Screening Study base case and N-1 contingencies do not appear in this study or the overloads have decreased due to a recent Western's re-rating of the Elverta-Hurley 230-kV lines and the Hurley-Tracy 230-kV lines. Overloaded elements in this reports' tables are in regards to emergency ratings.

Load serving capability in the Sacramento Valley Area increases with the additional generation on line by 165 MW. This is an indication in support of the plant location since the transmission loading combined with losses points to no impact on the interconnected transmission. No negative impact on the existing transmission system was found. Without REP, the City has planned to add a second 230/60-kV transformer at Fiddyment and upgrade the 60-kV line between Fiddyment and Foothills to cater for the N-1 contingencies.

The study results indicate that the second 230/60-kV transformer at Fiddyment Substation can be deferred to a later date if the REP is constructed and the City's 60-kV transmission system reinforcement is completed as planned. The Fiddyment-Foothill 60-kV circuit upgrade would still be required even without the new generation. The City plans to bundle the conductor on the Fiddyment-Foothills 60-kV line, increasing the rating from 65 MVA to 130 MVA.

	No Generation Added	**With REP on the 60-kV System**	**Difference (MW)**
SYSTEM LOSSES	**Ploss (MW)**	**Ploss (MW)**	
Roseville's 60-kV System	1.08	3.92	2.84
PG&E Area 30	977.53	972.73	(4.80)

Base Case Study Assumptions

The study focuses on the anticipated summer peak load condition for the 2006 summer season. The base case load assumption is one in ten load forecast for the Sacramento area, and PG&E's Area 5 (Sierra), and is temperature adjusted load forecast for the surrounding areas.

The following is a summary of the 2006 heavy summer base case with heavy load conditions in the greater Sacramento valley region:

2006 SUMMER PEAK NORTH-TO-SOUTH CASE	
Study Path	**Flow (MW)**
PACI + COTP	4,300 (N-S)
Planning Area Load	**MW**
Sacramento Area	3,171 (SMUD), 320 (Roseville),
Generation	**MW**
Sutter Energy Center	525
Cosumnes Power Plant	500
SMUD Hydro & Thermal Generation	1,591
CVP Hydro generation	1,130
NCPA's Roseville CT	0
East Altamont Energy Center	1,070
FPL Tesla Combined Cycle	982
Delta Energy Center	880
Los Medanos Energy Center	582
Metcalf Energy Center	600
Potrero Unit 7	370

To accommodate the REP generation in the base case, existing generation was reduced at Los Medanos Energy Park by 50 MW, Delta Energy Center 50 MW, and 60 MW at Moss Landing. The generation numbers in the above table reflect these reductions.

The new normal and emergency line ratings for Elverta-Hurley 1 & 2 and Hurley-Tracy 1 & 2 and a new emergency rating for the Elverta Bus Sectionalizing Breaker 1182 were used.

	Old Normal Rating (MVA)	Old Emerg. Rating (MVA)	New Normal Rating (MVA)	New Emerg. Rating (MVA)
Elverta-Hurley #1	318.70	318.70	395.98	435.42
Elverta-Hurley #2	318.70	318.70	435.42	478.84
Hurley-Tracy #1	318.70	318.70	395.98	435.42
Hurely-Tracy #2	318.70	318.70	435.42	478.84
Elverta Bus Sectionalizing Brkr	797	797	797	892.3

Power Flow Results

Single Contingency Studies

The 2006 base case, without the REP generation included, has 26 overloaded elements under N-1 conditions as shown in Table 1. The worst N-1, without REP, is the loss of one of the 230/60-kV Roseville transformers (see Figure 3). With REP in-service the loading on the remaining transformer is reduced to less than 100% (see Figure 4).

Of the 26 overloaded elements without REP, all but 4 will improve with the addition of REP. With REP in-service the worst N-1 condition is the loss of the Elverta bus sectionalizing breaker. The loss of the Elverta bus sectionalizing breaker will cause the Hurley-Natomas and Hurley-Carmichael lines to increase their loading by an additional one to three percent. The loading on the Elverta-Hurley 230-kV lines increase 11-12% causing circuit #1 to exceed its emergency rating by 7%. (see Figure 5). See Table I.

Western is in the process of re-rating the Elverta-Hurley #1 and #2 lines, which will increase their emergency operating ratings. The 230-kV current transformers at Hurley are the next limiting factor and further studies are required to confirm the emergency ratings. Western will work with SMUD to assure the proper rating of the Elverta-Hurley lines.

The two new circuits connecting REP and Fiddyment will be 666.6 ACSS high temperature conductors and the normal summer rating is 125 MVA. These two lines shall be designed to cater for 145 MVA emergency rating. Alternatively, a Remedial Action Scheme shall be installed to reduce the output of the generation to match the emergency rating of the line under N-1 condition. The City's future system additions will eliminate these overloads. See Table I and Figure 6.1-2

Table I

Single Contingency with and without REP

	OVERLOADED ELEMENT						
Outage	From	kV	To	kV	Ckt	Base Case w/o REP	With REP
Roseville 230/60-kV #1	ROSEVILL	230	ROSEVLL2	60	#2	118	98
Roseville 230/60-kV #2	ROSEVILL	230	ROSEVLL1	60	#1	117	97
ElvertaW-ElvertaS 230-kV	HURLEY S	230	CARMICAL	230	#1	109	113
Tracy-Tesla 230-kV #2	TRCY PMP	230	TESLA D	230	#1	108	110
Tracy-Tesla 230-kV #1	TRCY PMP	230	TESLA D	230	#2	108	110
ElvertaW-ElvertaS 230-kV	HURLEY S	230	NATOMAS	230	#1	108	109
Fiddyment 230/60-kV	FTHILL	60	RSCIND	60	#1	107	38
Cottonwood-Roseville 230-kV	OBANION	230	ELVERTAW	230	#1	105	101
Cottonwood-Roseville 230-kV	OBANION	230	ELVERTAW	230	#2	105	101
Tracy-Hurley 230-kV #2	OBANION	230	ELVERTAW	230	#1	104	100
Tracy-Hurley 230-kV #2	OBANION	230	ELVERTAW	230	#2	104	100
Tracy-Hurley 230-kV #1	OBANION	230	ELVERTAW	230	#1	104	100
Tracy-Hurley 230-kV #1	OBANION	230	ELVERTAW	230	#2	104	100
Roseville-Folsom 230-kV	OBANION	230	ELVERTAW	230	#1	103	100
Roseville-Folsom 230-kV	OBANION	230	ELVERTAW	230	#2	103	100
Fiddyment 230/60-kV	ROSEVILL	230	ROSEVLL2	60	#2	102	52
ElkGrove-RanchoSeco 230-kV	OBANION	230	ELVERTAW	230	#1	101	97
ElkGrove-RanchoSeco 230-kV	OBANION	230	ELVERTAW	230	#2	101	97
SRWTP-Pocket1 69-kV	OBANION	230	ELVERTAW	230	#1	101	97
SRWTP-Pocket1 69-kV	OBANION	230	ELVERTAW	230	#2	101	97
Olinda-Keswick 230-kV	OBANION	230	ELVERTAW	230	#1	100	97
Olinda-Keswick 230-kV	OBANION	230	ELVERTAW	230	#2	100	97
Hedge-RanchoSeco 230-kV	OBANION	230	ELVERTAW	230	#1	100	97
Hedge-RanchoSeco 230-kV	OBANION	230	ELVERTAW	230	#2	100	97
Orangevale-Whiterock 230-kV	OBANION	230	ELVERTAW	230	#1	100	97
Orangevale-Whiterock 230-kV	OBANION	230	ELVERTAW	230	#2	100	97
ElvertaW-ElvertaS 230-kV	ELVERTAW	230	HURLEY S	230	#1	95	107
ElvertaW-ElvertaS 230-kV	ELVERTAW	230	HURLEY S	230	#2	89	100
REP60-Fiddyment #1 60-kV	REP60	60	FIDDYMNT	60	#2	n/a	110
REP60-Fiddyment #2 60-kV	REP60	60	FIDDYMNT	60	#1	n/a	110

Re-rating of Elverta-Hurley lines pending. New rating will eliminate overloads.

Double Contingency Studies

Six elements overload under N-2 conditions in the base case prior to adding the new REP generation. The worst N-2 contingency without REP is the loss of the Tracy-Hurley 1 & 2 lines. See Figure 7. All overloads are reduced with REP in-service. See Table II.

The worst N-2 contingency with REP in-service is the loss of the Elverta-Hurley 1 & 2 lines. See Figure 8.

Double Contingencies with and without REP

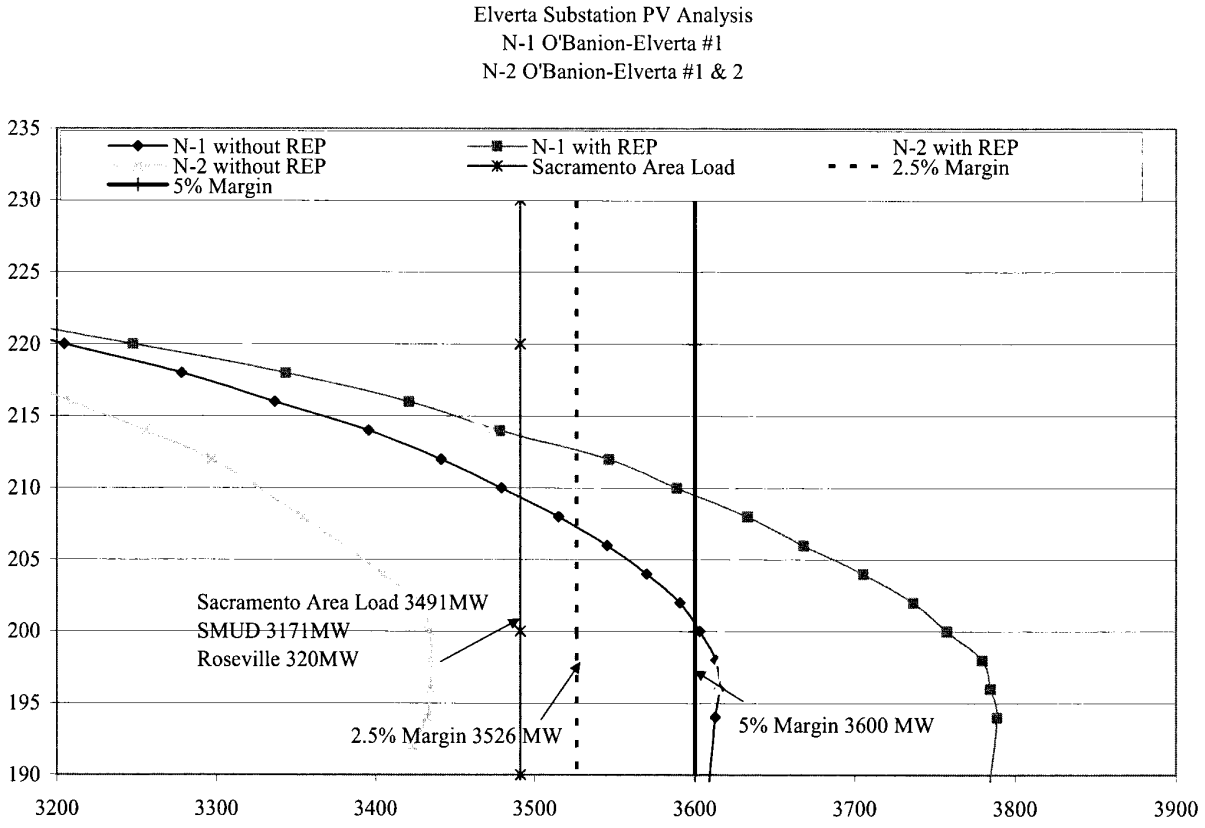
Table II

Outage	From	kV	To	kV	Ckt	Base Case w/o REP	With REP
Fiddyment-Elverta & Roseville-Elverta 230-kV	OBANION	230	ELVERTAW	230	#2	Case Diverges	102
Fiddyment-Elverta & Roseville-Elverta 230-kV	OBANION	230	ELVERTAW	230	#1	Case Diverges	102
Tracy-Hurley 1 & 2 230-kV	OBANION	230	ELVERTAW	230	#2	111	106
Tracy-Hurley 1 & 2 230-kV	OBANION	230	ELVERTAW	230	#1	111	106
Fiddyment-Elverta & Fiddyment-Roseville 230-kV	FTHILL	60	RSCIND	60	#1	108	38
Tracy-Hurley 1 & 2 230-kV	TRACY	230	TESLA	230	#1	109	108
Tracy-Hurley 1 & 2 230-kV	TRACY	230	TESLA	230	#2	109	108
Fiddyment-Elverta & Fiddyment-Roseville 230-kV	ROSEVILL	230	ROSEVLL2	60	#2	102	52
Elverta-Hurley 1 & 2 230-kV	ELVERTAS	230	ELVERTAW	230	#1	98	110

PV Analyis:

PV curves have been developed at Elverta 230-kV bus for the base case as well as single and double contingencies. The worst single contingency is the loss of O'Banion-Elverta #1 line and the worst double contingency is the loss of both O'Banion-Elverta lines. The analysis confirms that REP will improve the area transmission voltage and import capability. Load serving capability into the Sacramento Valley Area increases with the additional generation on line by 165MW. PV curves for the base case with and without REP are shown in the diagram below.

The Western Electric Coordinating Council (WECC) and the North American Electric Reliability Council (NERC) planning criteria were used to evaluate the impact of the REP generation project.



Voltages:

No voltage criteria violation exist prior to or after the addition of REP.

Sensitivity Studies:

Sensitivity studies were run with the Roseville CTs on line and generating 50MW. The additional 50MW of generation has little effect on the City's 60-kV or the 230-kV transmission system. No overloads are seen on the 60-kV system and the overloaded 230-kV elements that appear in the tables above increase by 1 to 3 %.

A spring sensitivity study was also performed with the following conditions:

2006 SPRING CASE	
Study Path	**Flow (MW)**
PACI + COTP	4,200 (N-S)
Planning Area Load	**MW**
Sacramento Area	1,711 (SMUD), 160 (Roseville),
Generation	**MW**
Sutter Energy Center	525
Cosumnes Power Plant	500
SMUD Hydro & Thermal Generation	1,493
CVP Hydro generation	1,130
NCPA's Roseville CT	0
East Altamont Energy Center	1,070
FPL Tesla Combined Cycle	440
Delta Energy Center	880
Los Medanos Energy Center	500
Metcalf Energy Center	600
Potrero Unit 7	370

No voltage criteria violation exist prior to or after the addition of REP in the Spring Sensitivity Study. The only overloaded element, which appears under spring conditions, is with an outage of one of the tie lines between the REP and Fiddyment 60-kV Substation. As described in the Power Flow Results, a Remedial Action Scheme shall be installed to reduce the output of the generation to match the emergency rating of the line under N-1 condition. The City's future system additions will eliminate these overloads. See Figures 9 and 10.

Dynamic Stability Studies:

Western recently conducted dynamic stability studies for a larger plant, Roseville Energy Facility (REF) in the same general location to determine whether such a plant would create instability following selected outages. Table III outlines the outage scenarios assumed for this analysis. The results indicated that the REF would have no adverse impact on the stable operation of the transmission system following the selected disturbances. It is Western's conclusion that since the proposed REP is much smaller in

size and would not pose any negative impact on the interconnected transmission system. However, Western could perform the additional stability study if needed at a later date.

Dynamic Stability studies were performed for the disturbances listed in the table below.

Table III – Disturbances for Dynamic Stability Studies

List of Dynamic Stability Disturbances	
1	3-phase 6-cycle fault at the Elverta 230 kV, west section, bus, followed by tripping of both ELVERTAW-RIOLINDA 230 kV lines.
2	3-phase fault with 14-cycle clearing at the Elverta 230 kV, east section, bus.
3	3-phase fault with 14-cycle clearing at the Elverta 230 kV, west section, bus.
4	3-phase fault with 6-cycle clearing at the REF 230 kV bus.
5	3-phase 6-cycle fault at the REF 230 kV bus, followed by tripping of REF 230-Elverta 230 kV line.
6	3-phase fault with 6-cycle clearing at the REF 230 kV bus followed by tripping of all REF units.
7	3-phase 6-cycle fault at the REF 230 kV bus, followed by tripping of REF 230-Roseville 230 kV line.
8	3-phase 6-cycle fault at the Roseville 230 kV bus, followed by tripping of Roseville-Folsom 230 kV line.
9	3-phase fault at the Roseville 230 kV bus with 6 cycle clearing.
10	3-phase fault at the Roseville 230 kV bus with 6 cycle clearing followed by tripping of Roseville-Elverta 230 kv line.
11	3-phase fault at the Roseville 230 kV bus with 6 cycle clearing followed by tripping of REF 230-Roseville 230 kV line.

Study Criteria:

According to the *WSCC Disturbance-Performance Table of Allowable Effects on Other Systems*[1], after a Category "B" (n-1), disturbance, the transmission system performance should meet the following criteria:

- Transient voltage dip should not be below 25 percent at load buses or 30 percent at non-load buses at any time.
- The duration of the transient voltage dip greater than 20 percent should not exceed 20 cycles at load buses.
- The minimum transient frequency should not fall below 59.6 Hz for 6 cycles or more at load buses.

After a Category "C" (n-2), disturbance, the transmission system performance should meet the following criteria:

- Transient voltage dip should not be below 30 percent at any bus at any time.

[1] Cited from Draft Western System Coordinating Council (WSCC) Planning Standards published in December 2, 1999.

- The duration of a transient voltage dip greater than 20 percent should not exceed 40 cycles at load buses.
- The minimum transient frequency should not fall below 59.0 Hz for 6 cycles or more at load buses.

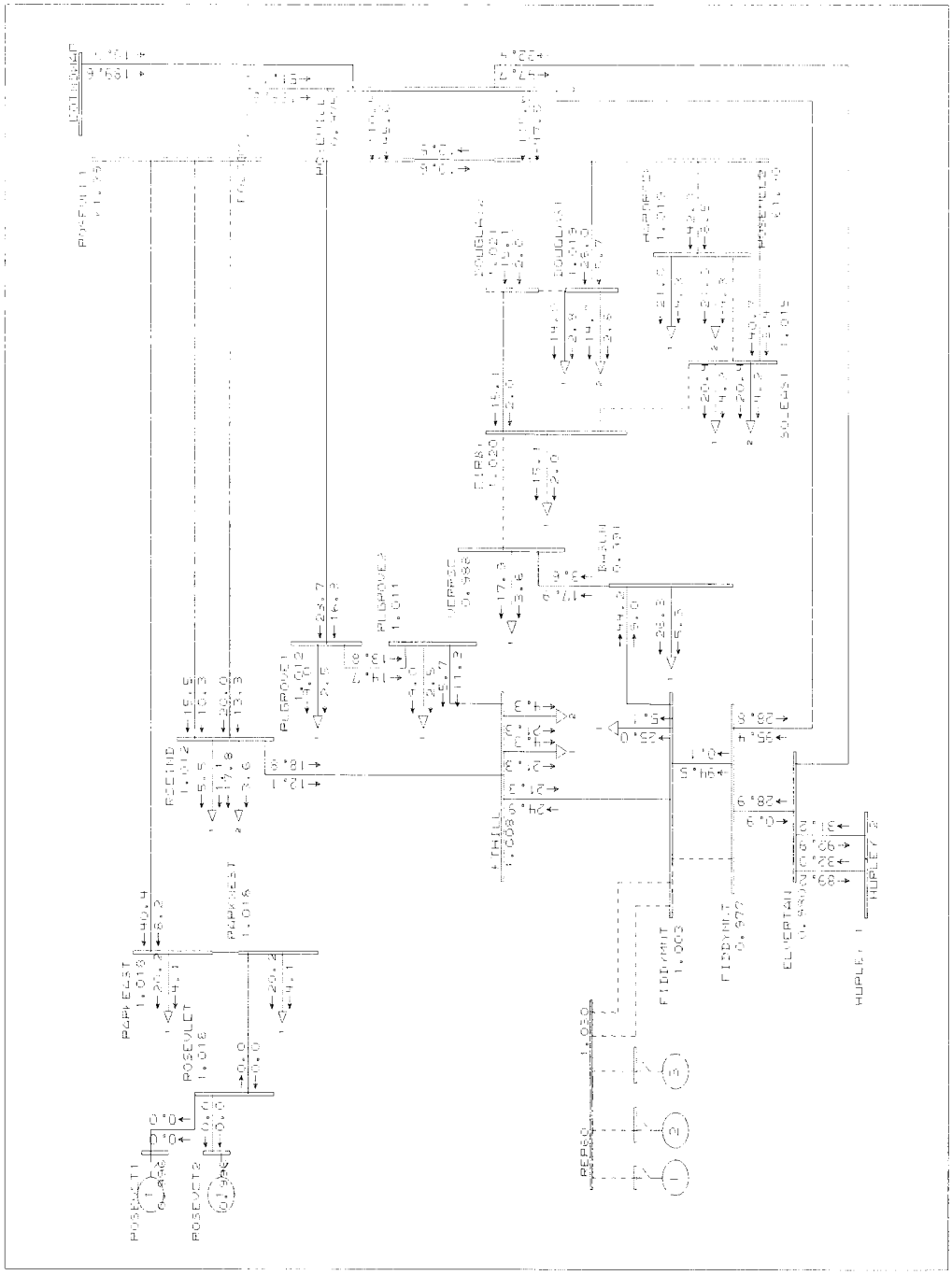
Short Circuit Studies:

Short circuit calculations were performed at all the busses on the City's system. All the existing circuit breakers are capable of handling the increase in fault level with REP on line. A summary of results are shown in the following table:

Table IV

Summary of Fault Current Studies							
	WITHOUT REP	WITH REP		WITHOUT REP	WITH REP		
Maximum Fault Current Applied at	SLG	SLG	% Change	3-phase	3-phase	% Change	PCB Rating (Amps)
Roseville 230-kV	11,758	12,015	2.19%	12,106	12,193	0.72%	31,500
Roseville 60-kV	26,346	27,258	3.46%	20,673	20,883	1.02%	31,500
SouthEast	6,382	6,433	0.80%	9,819	9,866	0.48%	31,500/20,000
Hardrock	10,350	10,487	1.32%	13,378	13,464	0.64%	31,500
Douglas West	7,359	7,428	0.94%	11,419	11,482	0.55%	20,000
Douglas East	7,359	7,427	0.92%	11,419	11,482	0.55%	20,000
Pleasant Grove	10,661	10,945	2.66%	13,939	14,102	1.17%	31,500
Industrial	12,219	12,571	2.88%	15,182	15,367	1.22%	31,500
ParkEast	10,329	10,453	1.20%	12,984	13,061	0.59%	31,500
ParkWest	10,257	10,379	1.19%	12,898	12,973	0.58%	31,500
Foothill	13,112	13,662	4.19%	15,696	15,951	1.62%	31,500/20,000
Fiddyment 230-kV	11,649	11,961	2.68%	12,277	12,371	0.77%	40,000
Fiddyment 60-kV	18,501	20,921	13.08%	15,512	15,960	2.89%	31,500/40,000
Cirby	5,238	5,272	0.65%	8,927	8,965	0.43%	31,500
Baseline	4,900	5,050	3.06%	7,294	7,387	1.28%	31,500
Roseville CT 60kV	7,349	7,403	0.73%	8,131	8,159	0.34%	31,500
REP 60kV		15,086			10,070		40,000

Figure 1 – 2006 Base Case – No REP City's load at 320MW



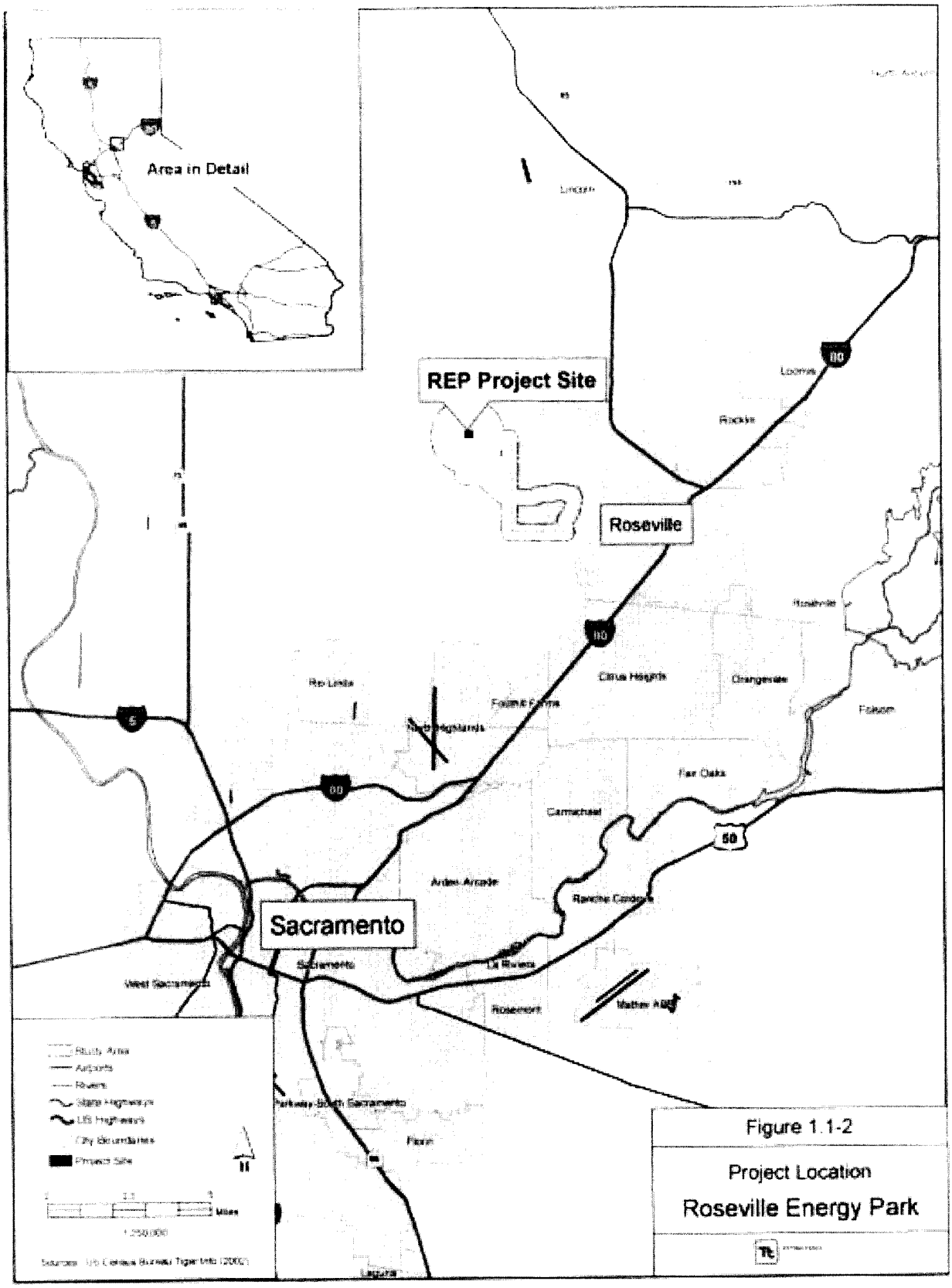

Area in Detail
REP Project Site
Roseville
Sacramento
Figure 1.1-2
Project Location
Roseville Energy Park

Figure 2 – With REP 160MW double circuit line to the Fiddyment 60-kV Substation. City's load 320MW.

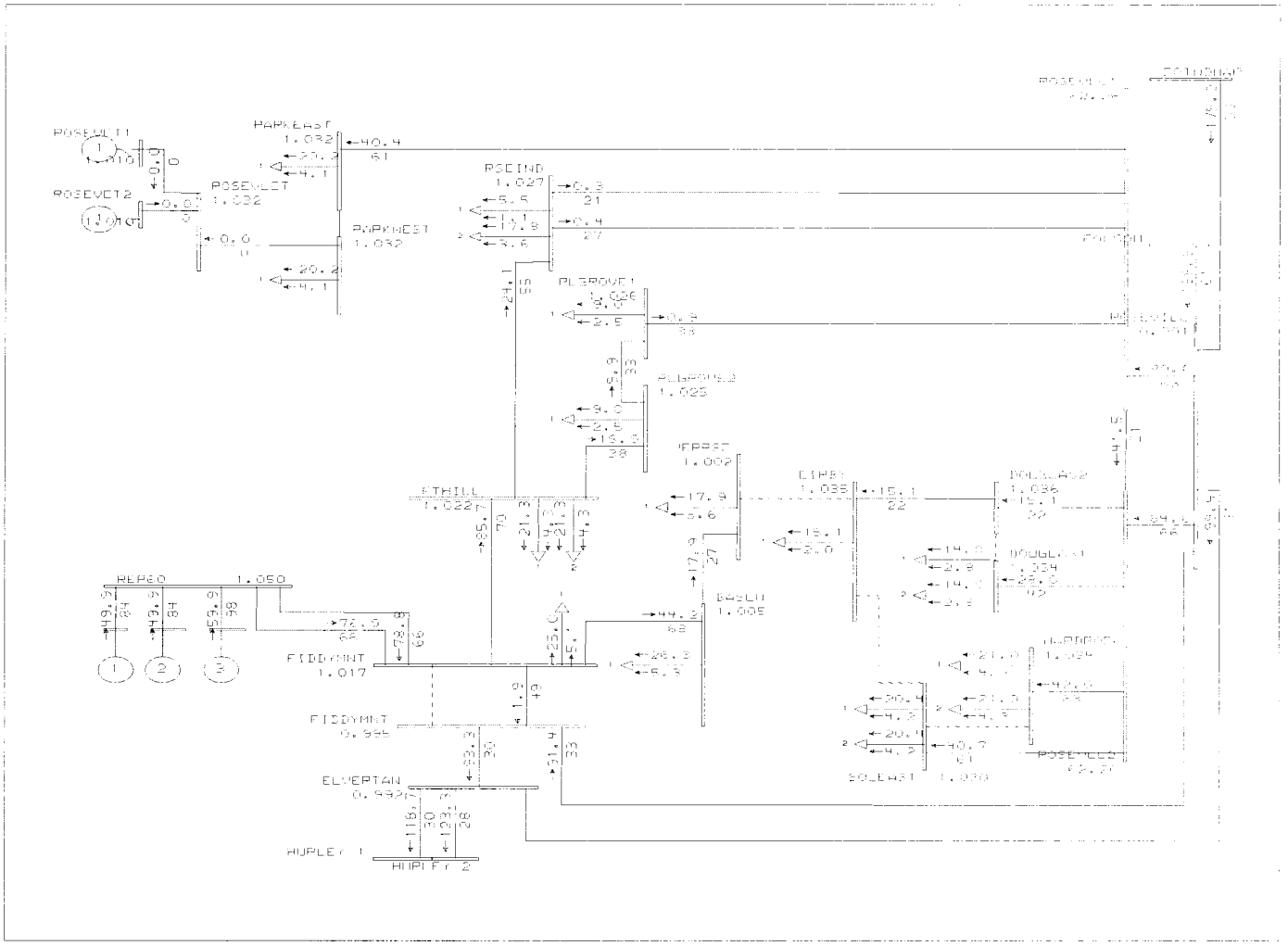


Figure 3 – No REP, Roseville 230/60-kV transformer out of service.

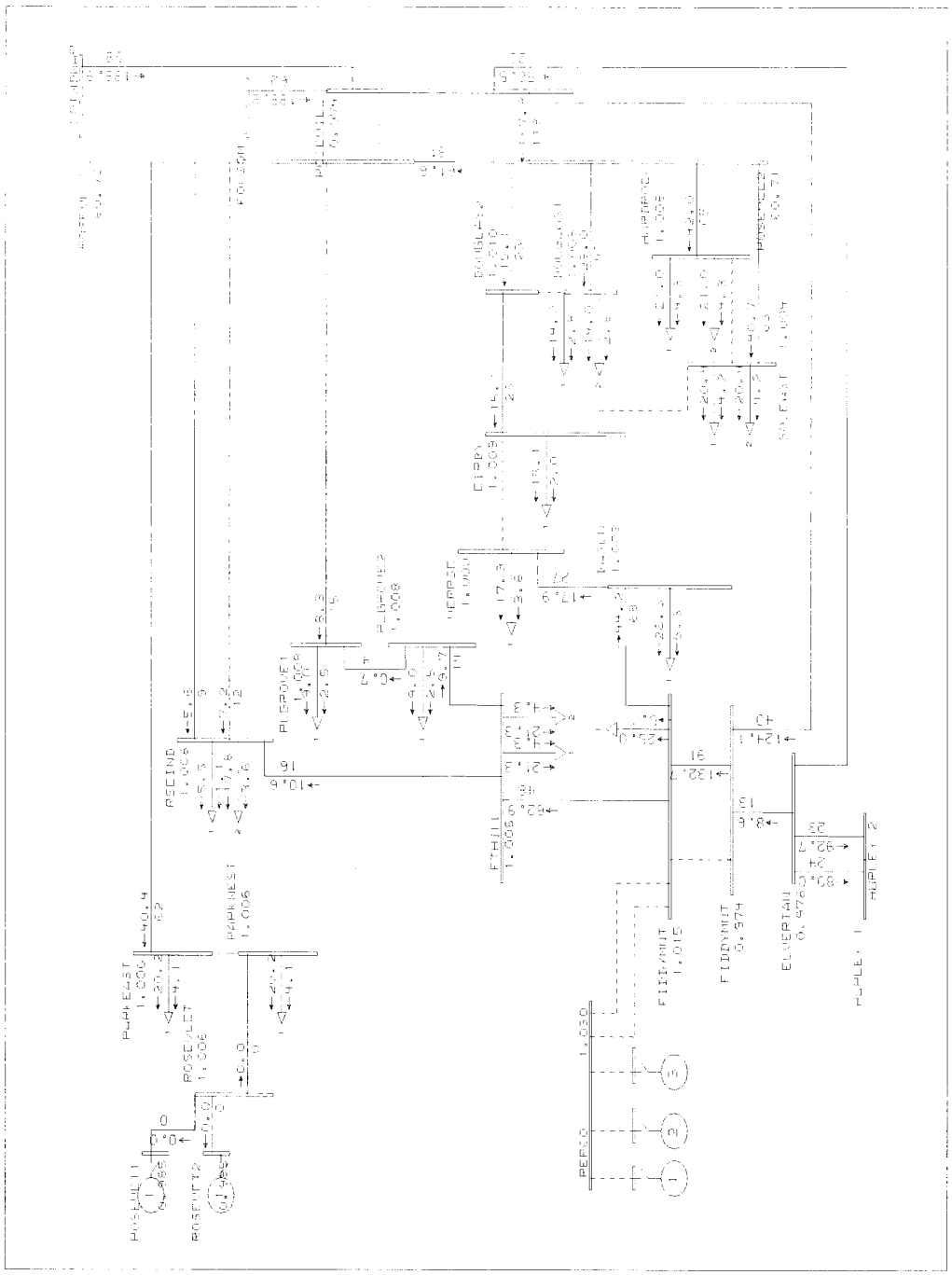


Figure 4 - REP in service, Roseville 230/60-kV transformer out of service.

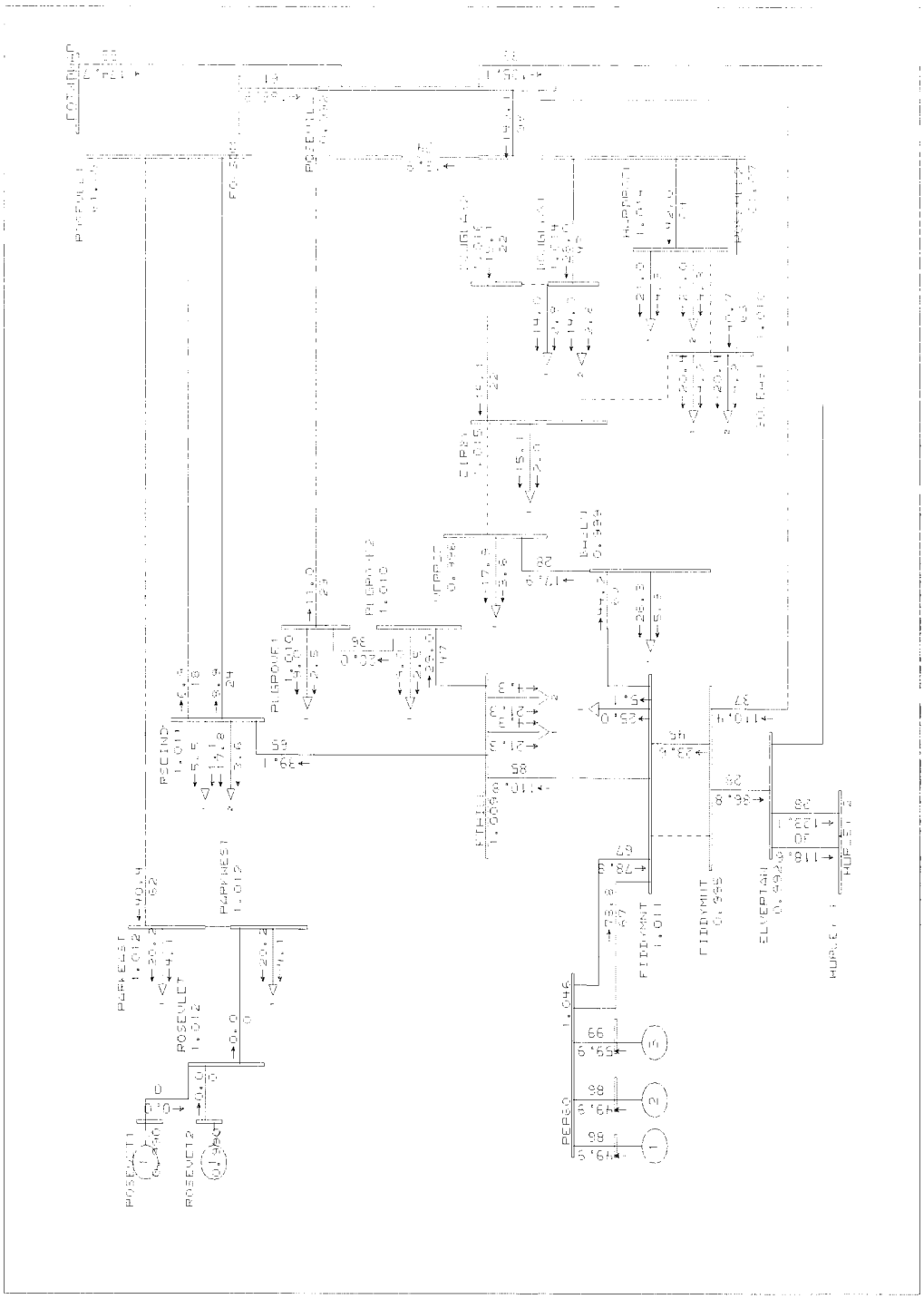
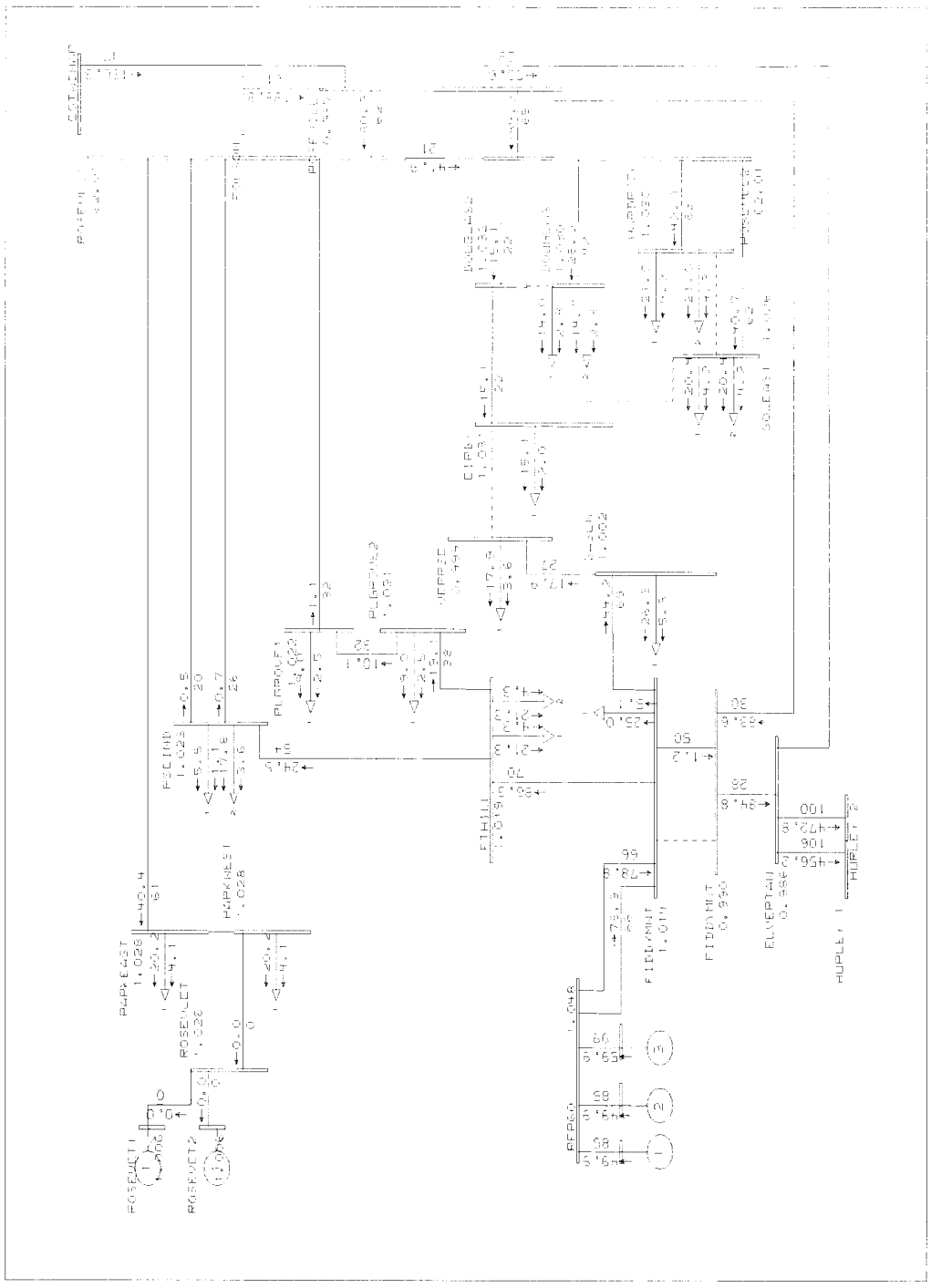


Figure 5 - REP in service, Elverta Bus Sectionalizing Breaker out of service.



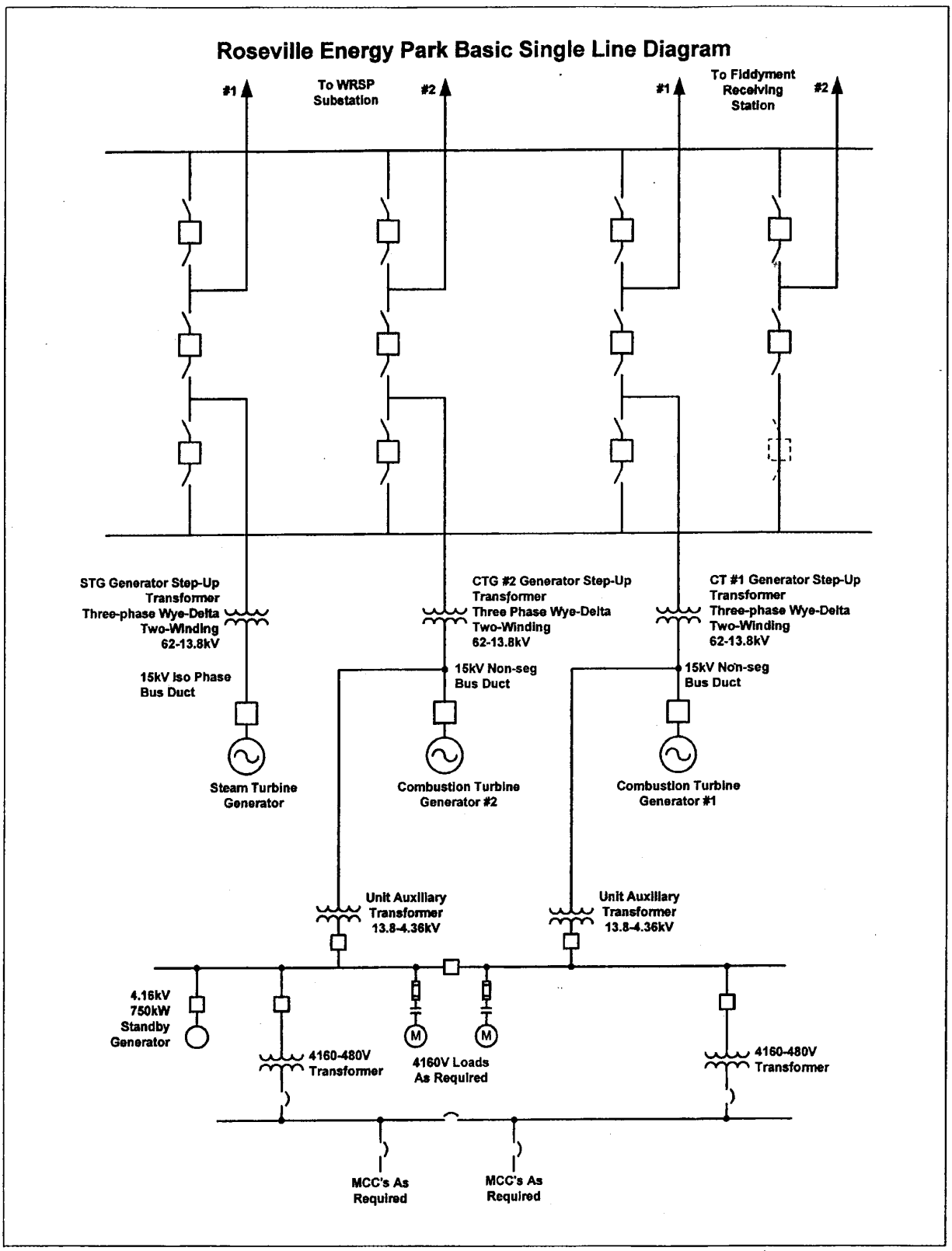


Figure 6.1-2. Proposed 60kV utility connection and local system map.

Figure 7 –WITHOUT REP Tracy-Hurley 1 & 2 out. City's load 320 MW.

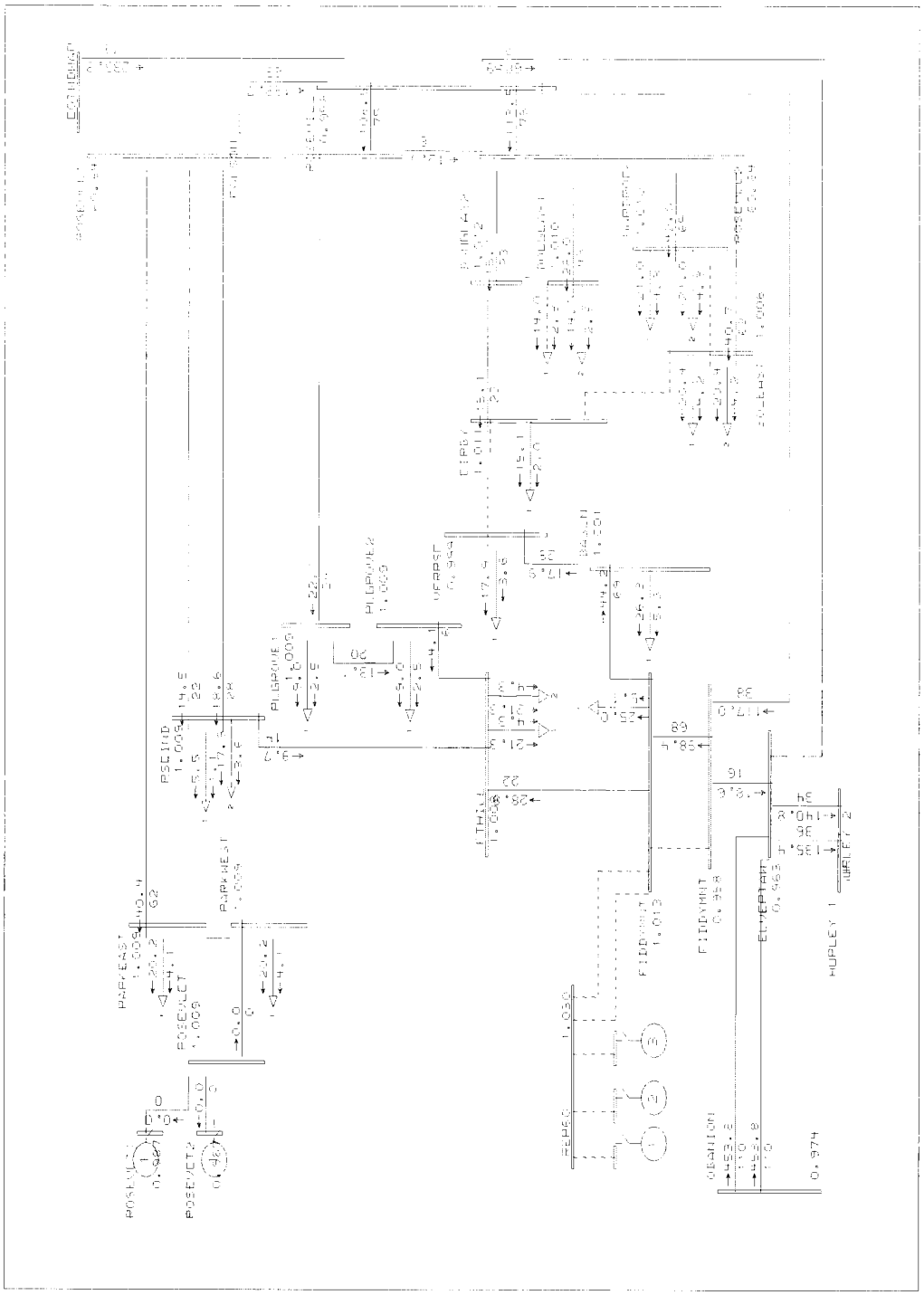


Figure 8 –WITH REP Elverta-Hurley 1 & 2 out. City's load 320 MW.

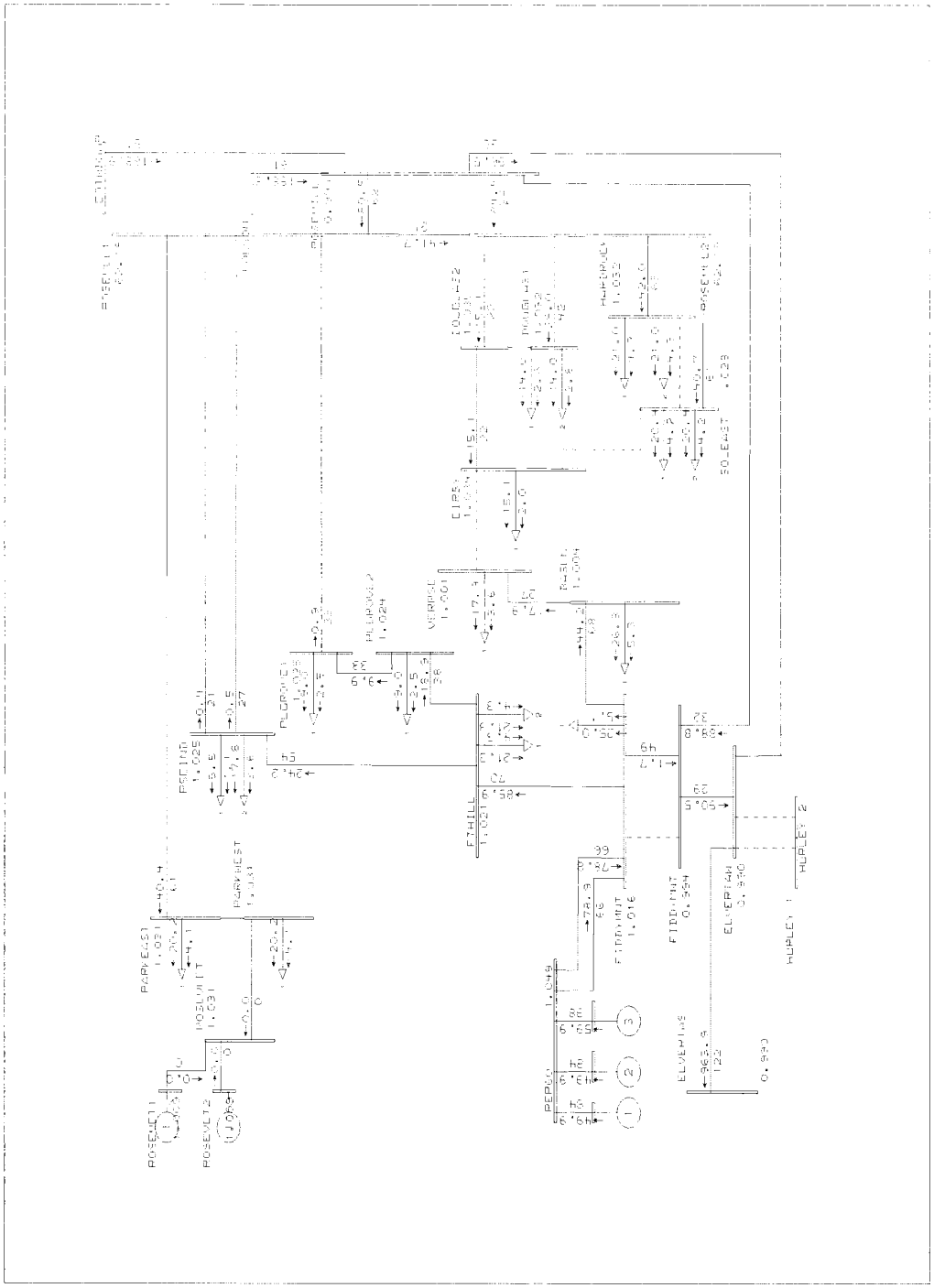


Figure 9 – SPRING WITHOUT REP City's load 160 MW.

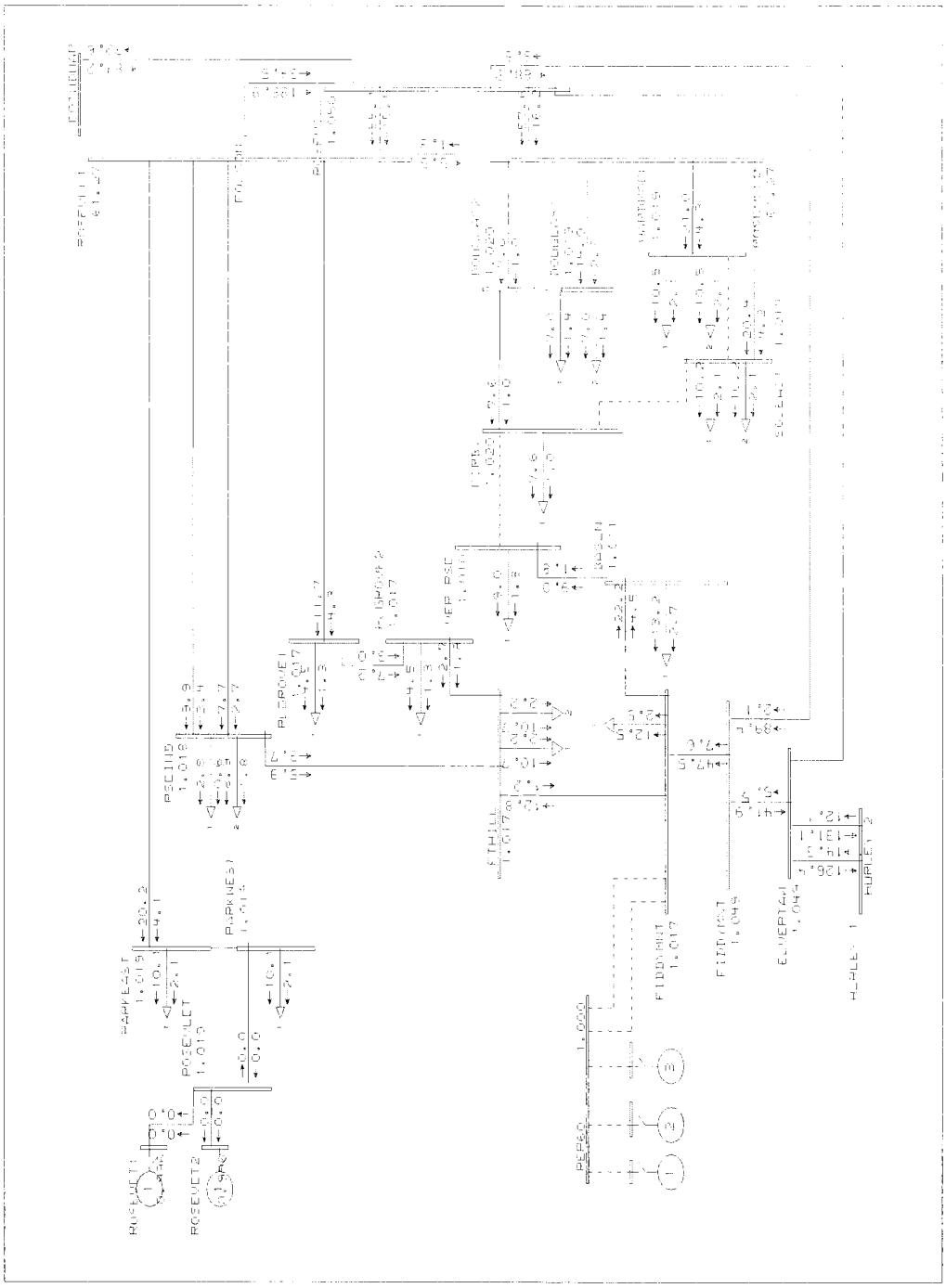
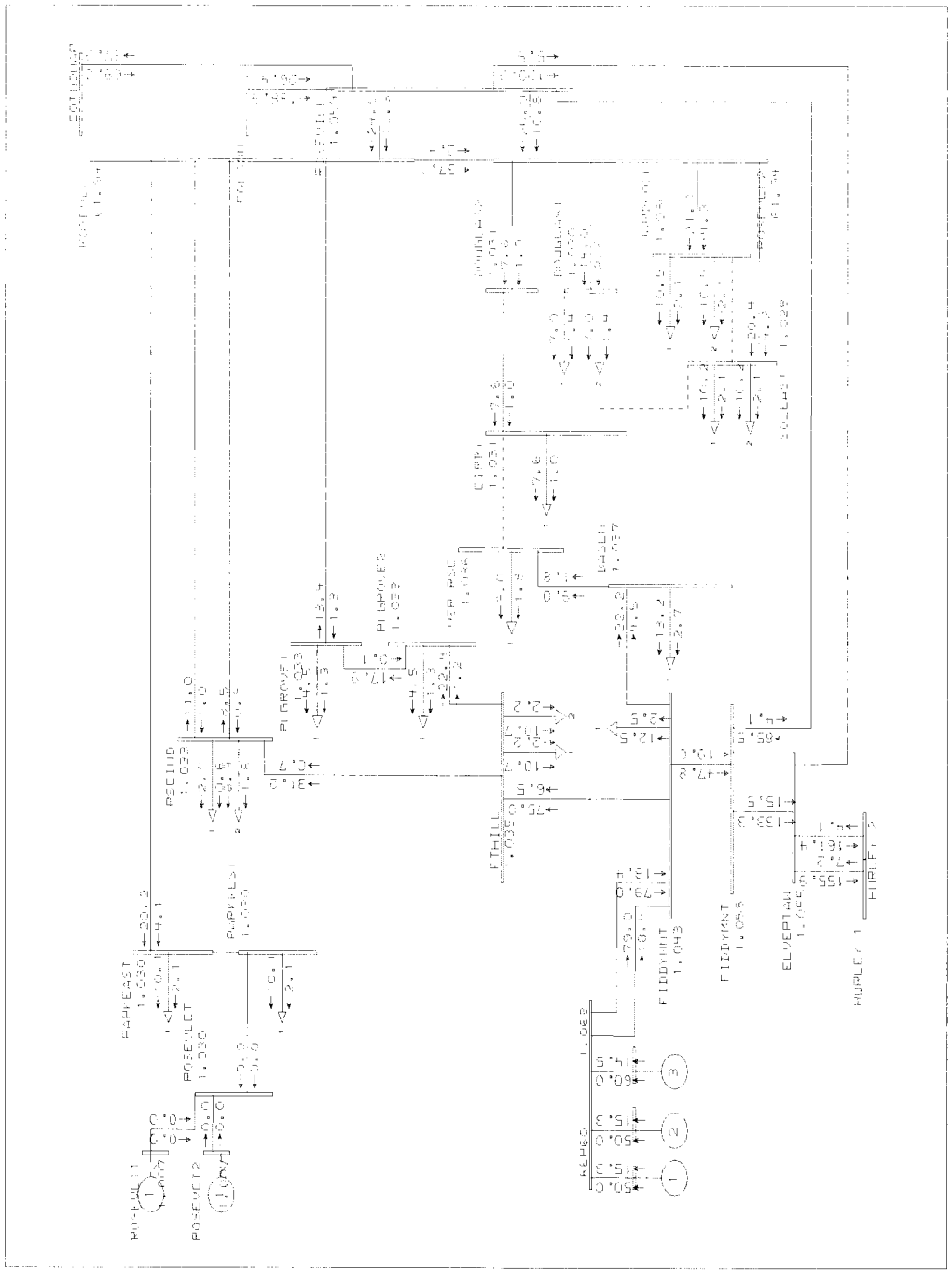


Figure 10 – SPRING With REP 160MW double circuit line to Fiddyment 60-kV Sub. City's load 160MW.



ATTACHMENT TE-2

Outage List

N-1 Contingencies for REP

OUTAGE # 1
RNCHSECO 230.00 COSUMNES 230.00 2 1

OUTAGE # 2
RNCHSECO 230.00 COSUMNES 230.00 1 1

OUTAGE # 3
EAEC230 230.00 WESTLEY 230.00 2 1

OUTAGE # 4
EAEC230 230.00 WESTLEY 230.00 1 1

OUTAGE # 5
EAEC230 230.00 TRCY PMP 230.00 2 1

OUTAGE # 6
EAEC230 230.00 TRCY PMP 230.00 1 1

OUTAGE # 7
ELVERTAW 230.00 HURLEY S 230.00 2 1

OUTAGE # 8
ELVERTAW 230.00 HURLEY S 230.00 1 1

OUTAGE # 9
TRACY YG 70.00 MODESTO 69.00 2 1

OUTAGE # 10
TRACY YG 70.00 MODESTO 69.00 1 1

OUTAGE # 11
KESWICK 230.00 OBANION 230.00 1 1

OUTAGE # 12
OLINDAW 230.00 OBANION 230.00 1 1

OUTAGE # 13
SUTTER 230.00 OBANION 230.00 1 1

OUTAGE # 14
OBANION 230.00 ELVERTAW 230.00 2 1
DELETE BUS
SUTTER 230.00

OUTAGE # 15
OBANION 230.00 ELVERTAW 230.00 1 1
DELETE BUS
SUTTER 230.00

OUTAGE # 16
KESWICK 115.00 KNAUF 115.00 1 1

OUTAGE # 17
KESWICK 115.00 EUREKA 115.00 1 1

OUTAGE # 18
KESWICK 115.00 SULP CRK 115.00 1 1

OUTAGE # 19
AIRPORTW 230.00 COTWDWAP 230.00 1 1

OUTAGE # 20
COTWDWAP 230.00 ROUND MT 230.00 1 1

OUTAGE # 21
COTWDWAP 230.00 ROSEVILL 230.00 1 1

OUTAGE # 22
COTWDWAP 230.00 SHASTA 230.00 1 1

OUTAGE # 23
COTWDWAP 230.00 SHASTA 230.00 2 1

OUTAGE # 24
FOLSOM 115.00 NIMBUS 115.00 1 1

OUTAGE # 25
KESWICK 230.00 AIRPORTW 230.00 1 1

OUTAGE # 26
KESWICK 230.00 J.F.CARR 230.00 1 1

OUTAGE # 27
KESWICK 230.00 J.F.CARR 230.00 2 1

OUTAGE # 28
KESWICK 230.00 SPRINGCR 230.00 2 1

OUTAGE # 29
MELONES 230.00 WILSON 230.00 1 1

OUTAGE # 30
OLINDAW 230.00 COTWDWAP 230.00 1 1

OUTAGE # 31
OLINDAW 230.00 COTWDWAP 230.00 2 1

OUTAGE # 32
OLINDAW 230.00 KESWICK 230.00 1 1

OUTAGE # 33
FIDDYMNT 230.00 ELVERTAW 230.00 1 1

OUTAGE # 34
FIDDYMNT 230.00 ROSEVILL 230.00 1 1

OUTAGE # 35
FLANAGAN 230.00 KESWICK 230.00 1 1

OUTAGE # 36
FLANAGAN 115.00 SHAST LK 115.00 1 1

OUTAGE # 37
FLANAGAN 115.00 KNAUF 115.00 1 1

OUTAGE # 38
SHAST LK 115.00 KNAUF 115.00 1 1

OUTAGE # 39
ROSEVLL1 60.00 ROSEVLL2 60.00 1 1

OUTAGE # 40
ROSEVLL1 60.00 PARKEAST 60.00 1 1

OUTAGE # 41
PARKWEST 60.00 ROSEVLCT 60.00 1 1

OUTAGE # 45
FIDDYMNT 60.00 FTHILL 60.00 1 1

OUTAGE # 46
FTHILL 60.00 RSCIND 60.00 1 1

OUTAGE # 47
RSCIND 60.00 ROSEVLL1 60.00 1 1

OUTAGE # 48
PLGROVE2 60.00 FTHILL 60.00 1 1

OUTAGE # 49
PLGROVE2 60.00 PLGROVE1 60.00 1 1

OUTAGE # 50
PLGROVE1 60.00 ROSEVLL1 60.00 1 1

OUTAGE # 51
ROSEVLL2 60.00 DOUGLAS2 60.00 1 1

OUTAGE # 52
ROSEVLL2 60.00 DOUGLAS1 60.00 1 1

OUTAGE # 53
VERRSC 60.00 BASLN 60.00 1 1

OUTAGE # 54
BASLN 60.00 FIDDYMNT 60.00 1 1

OUTAGE # 55
PARKEAST 60.00 PARKWEST 60.00 1 1

OUTAGE # 56
RSCIND 60.00 ROSEVLL1 60.00 2 1

OUTAGE # 57
DOUGLAS2 60.00 CIRBY 60.00 1 1

OUTAGE # 58
ROSEVLL2 60.00 HARDROCK 60.00 1 1

OUTAGE # 59
ROSEVLL2 60.00 SO_EAST 60.00 1 1

OUTAGE # 60
REP60 60.00 FIDDYMNT 60.00 1 1

OUTAGE # 61
REP60 60.00 FIDDYMNT 60.00 2 1

OUTAGE # 65

CIRBY 60.00 VERRSC 60.00 1 1

OUTAGE # 66
HARDROCK 60.00 SO_EAST 60.00 1 1

OUTAGE # 67
SO_EAST 60.00 CIRBY 60.00 1 1

OUTAGE # 68
SHASTA 230.00 FLANAGAN 230.00 1 1

OUTAGE # 69
TRCY PMP 230.00 TESLA D 230.00 1 1

OUTAGE # 70
TRCY PMP 230.00 TESLA D 230.00 2 1

OUTAGE # 71
TRCY PMP 230.00 HURLEY S 230.00 1 1

OUTAGE # 72
TRCY PMP 230.00 HURLEY S 230.00 2 1

OUTAGE # 73
TRCY PMP 230.00 LLNL 230.00 1 1

OUTAGE # 74
TRINITY 230.00 J.F.CARR 230.00 2 1

OUTAGE # 75
ELVERTAS 230.00 ELVERTAW 230.00 1 1

OUTAGE # 76
CAMINO S 230.00 LAKE 230.00 1 1

OUTAGE # 77
CAMINO S 230.00 UNIONVLY 230.00 1 1

OUTAGE # 78
CAMINO S 230.00 WHITEROK 230.00 1 1

OUTAGE # 79
CAMPBELL 230.00 HEDGE 230.00 1 1

OUTAGE # 80
CAMPBELL 230.00 POCKET 230.00 1 1

OUTAGE # 81
CARMICAL 230.00 HURLEY S 230.00 1 1

OUTAGE # 82
CARMICAL 230.00 ORANGEVL 230.00 1 1

OUTAGE # 83
ELKGROVE 230.00 HEDGE 230.00 1 1

OUTAGE # 84
ELKGROVE 230.00 RNCHSECO 230.00 1 1

OUTAGE # 85
ELVERTAS 230.00 FOOTHILL 230.00 1 1

OUTAGE # 86
ELVERTAS 230.00 ORANGEVL 230.00 1 1

OUTAGE # 87
FOOTHILL 230.00 ORANGEVL 230.00 1 1

OUTAGE # 88
HEDGE 230.00 RNCHSECO 230.00 1 1

OUTAGE # 89
JAYBIRD 230.00 UNIONVLY 230.00 1 1

OUTAGE # 90
JAYBIRD 230.00 WHITEROK 230.00 1 1

OUTAGE # 91
LAKE 230.00 ORANGEVL 230.00 1 1

OUTAGE # 92
ORANGEVL 230.00 WHITEROK 230.00 1 1

OUTAGE # 93
POCKET 230.00 LAKE 230.00 1 1

OUTAGE # 94
POCKET 230.00 RNCHSECO 230.00 1 1

OUTAGE # 95
POCKET 230.00 RNCHSECO 230.00 2 1

OUTAGE # 96

PROCTER 230.00 HEDGE 230.00 1 1

OUTAGE # 97
PROCTER 230.00 HURLEY S 230.00 1 1

OUTAGE # 98
WHITEROK 230.00 HEDGE 230.00 1 1

OUTAGE # 99
EAST CTY 115.00 HEDGE 115.00 1 1

OUTAGE # 100
EAST CTY 115.00 HURLEY 115.00 1 1

OUTAGE # 101
EAST CTY 115.00 MID CTY 115.00 1 1

OUTAGE # 102
EAST CTY 115.00 MID CTY 115.00 2 1

OUTAGE # 103
ELVERTAS 115.00 NORTHCTY 115.00 1 1

OUTAGE # 104
HEDGE 115.00 SOUTHCTY 115.00 1 1

OUTAGE # 105
HEDGE 115.00 SOUTHCTY 115.00 2 1

OUTAGE # 106
HURLEY 115.00 NORTHCTY 115.00 1 1

OUTAGE # 107
HURLEY 115.00 NORTHCTY 115.00 2 1

OUTAGE # 108
MID CTY 115.00 STA. B 115.00 1 1

OUTAGE # 109
NORTHCTY 115.00 STA. A 115.00 1 1

OUTAGE # 110
NORTHCTY 115.00 STA. A 115.00 2 1

OUTAGE # 111
NORTHCTY 115.00 STA. B 115.00 1 1

OUTAGE # 112
NORTHCTY 115.00 STA. B 115.00 2 1

OUTAGE # 113
SOUTHCTY 115.00 STA. B 115.00 1 1

OUTAGE # 114
STA. A 115.00 STA. D 115.00 1 1

OUTAGE # 115
STA. B 115.00 STA. D 115.00 1 1

OUTAGE # 116
JONESFRK 69.00 UNIONVLY 69.00 1 1

OUTAGE # 117
LOON LK 69.00 ROBBS PK 69.00 1 1

OUTAGE # 118
LOON LK 69.00 UNIONVLY 69.00 1 1

OUTAGE # 119
ELVERTA1 69.00 ELVERTA2 69.00 1 1

OUTAGE # 120
MCCLELLN 69.00 FOOTHIL1 69.00 1 1

OUTAGE # 121
ROBBS PK 69.00 UNIONVLY 69.00 1 1

OUTAGE # 122
SRWTP 69.00 POCKET 1 69.00 1 1

OUTAGE # 123
UCDMC 22.00 MID CTY3 22.00 1 1

OUTAGE # 124
NATOMAS 230.00 HURLEY S 230.00 1 1

OUTAGE # 125
ELVERTAS 230.00 NATOMAS 230.00 1 1

OUTAGE # 126
FIDDYMNT 230.00 FIDDYMNT 60.00 1 1

OUTAGE # 128
ROSEVILL 230.00 ROSEVLL1 60.00 1 1

OUTAGE # 129
ROSEVILL 230.00 ROSEVLL2 60.00 2 1

OUTAGE # 133
ROSEVILL 230.00 FOLSOM 230.00 1 1
DELETE ISLANDS

N-2 Contingencies for REP

OUTAGE # 1
TRCY PMP 230.00 HURLEY S 230.00 1 1
TRCY PMP 230.00 HURLEY S 230.00 2 1

OUTAGE # 2
TRCY PMP 230.00 TESLA D 230.00 1 1
TRCY PMP 230.00 TESLA D 230.00 2 1

OUTAGE # 3
ELVERTAW 230.00 HURLEY S 230.00 1 1
ELVERTAW 230.00 HURLEY S 230.00 2 1

OUTAGE # 4
OBANION 230.00 ELVERTAW 230.00 1 1
OBANION 230.00 ELVERTAW 230.00 2 1
DELETE BUS
SUTTER 230.00

OUTAGE # 5
REP60 60.00 FIDDYMNT 60.00 1 1
REP60 60.00 FIDDYMNT 60.00 2 1
DELETE BUS
REP60 60.00

OUTAGE # 6
REP60 60.00 WEST RSC 60.00 1 1
REP60 60.00 WEST RSC 60.00 2 1
DELETE BUS

REP60 60.00

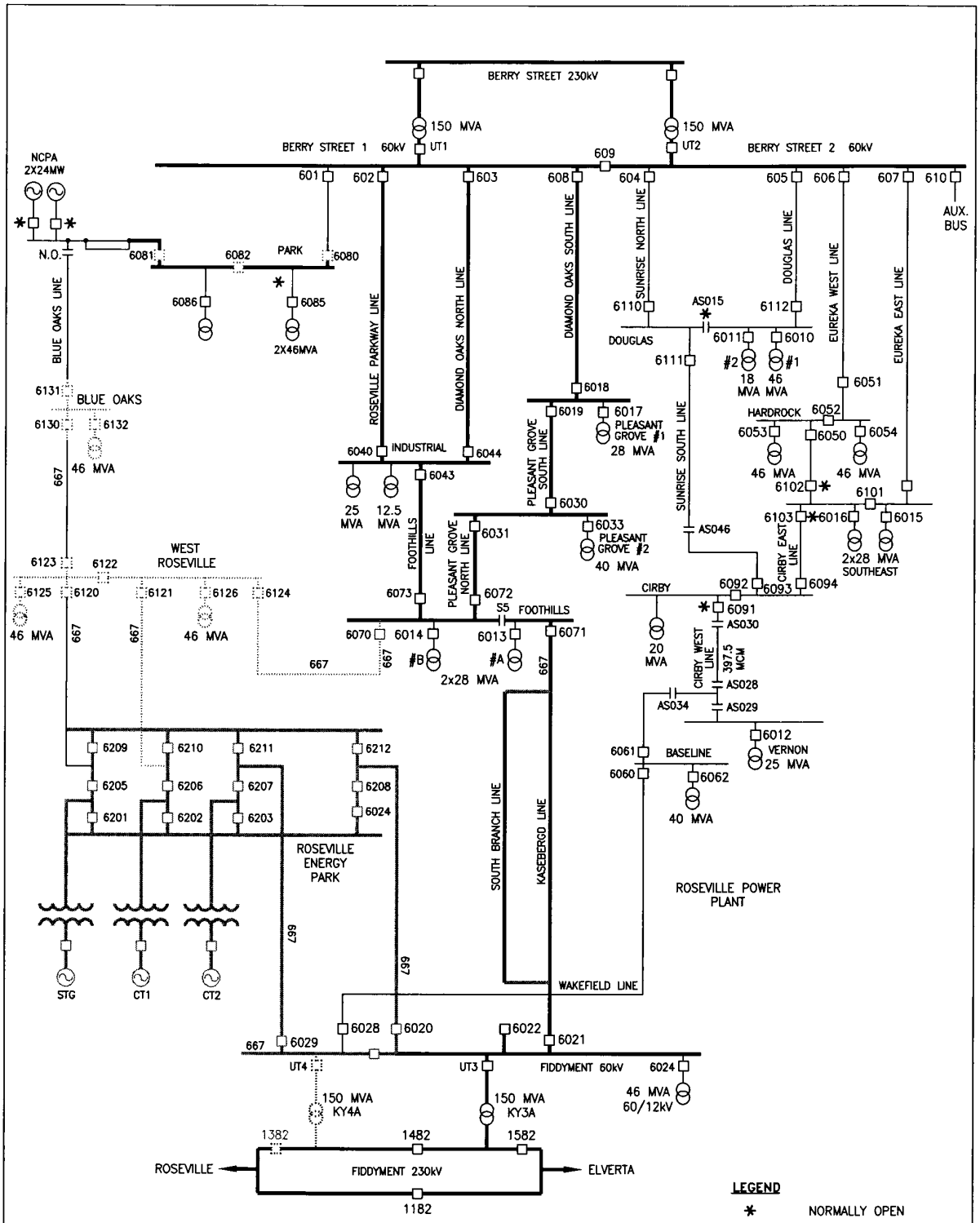
OUTAGE # 7
FIDDYMNT 230.00 ELVERTAW 230.00 1 1
ROSEVILL 230.00 ELVERTAW 230.00 1 1

OUTAGE # 8
FIDDYMNT 230.00 ELVERTAW 230.00 1 1
FIDDYMNT 230.00 ROSEVILL 230.00 1 1

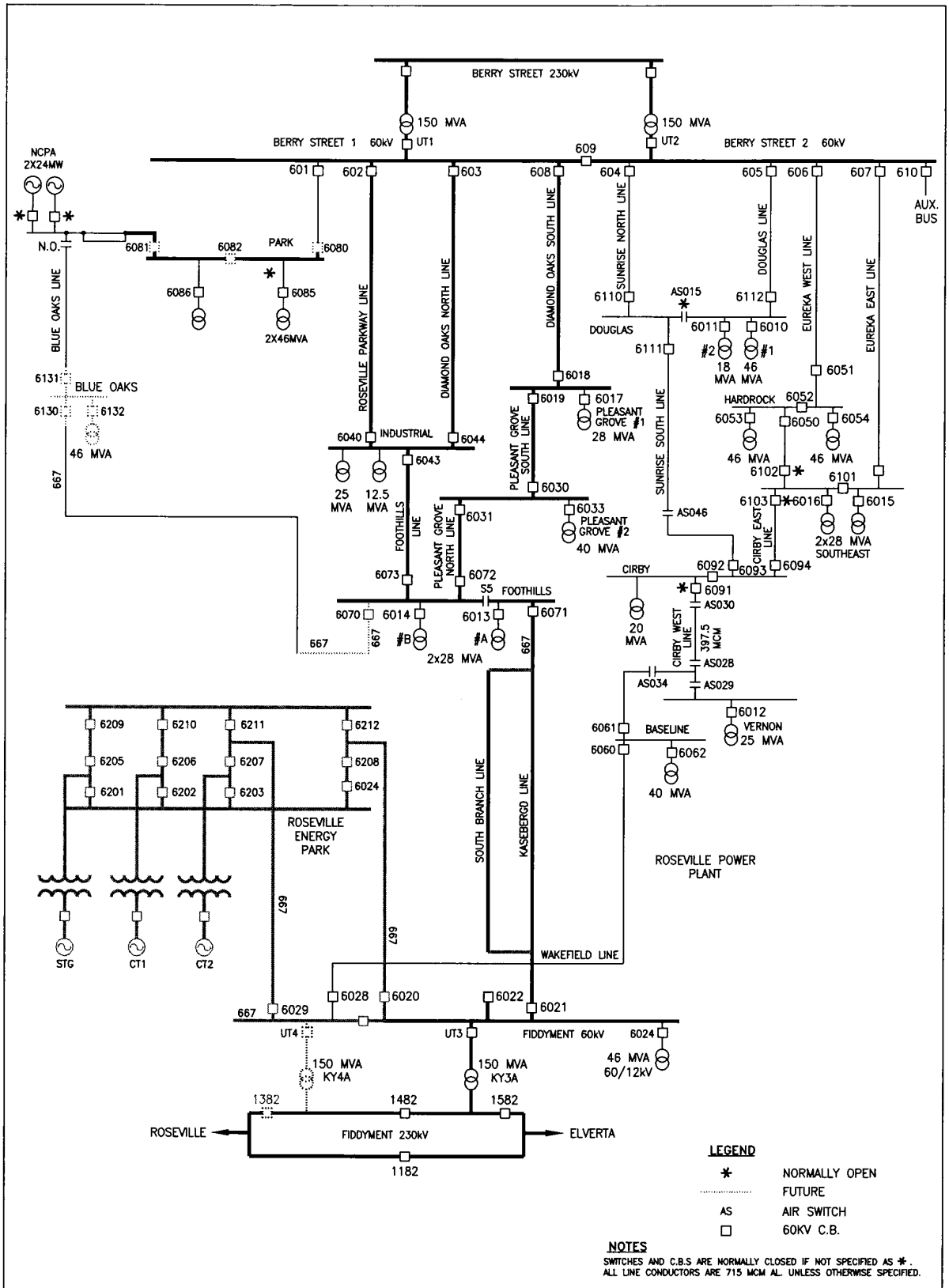
OUTAGE # 9
NATOMAS 230.00 HURLEY S 230.00 1 1
ELVERTAS 230.00 NATOMAS 230.00 1 1

ATTACHMENT TE-3

One-Line Diagrams



ELECTRIC DEPARTMENT (916) 774-5601 M:\60kv Circuit Diagrams\SKETCH1-REP ONE LINE_rev-0	ENG. K. HUNG	APPR.	SCALE NONE
	DR. KB	REVISION 0	DATE 1/22/04
PROPOSED 60-kV CIRCUIT DIAGRAM (2006)			JOB NO.
			ACCOUNT NO.
			DRAWING NO. SKETCH1-REP ONE LINE



CITY OF ROSEVILLE INCORPORATED APRIL 10, 1909

ELECTRIC DEPARTMENT

(916) 774-5601

ENG. K. HUNG	APPR.	SCALE NONE	JOB NO.
DR. KB	REVISION 0	DATE 1/22/04	

PROPOSED
60-kV CIRCUIT DIAGRAM
(2006) Without WRSP

ACCOUNT NO.

DRAWING NO.
SKETCH1-REP
W/O WRSP

N:\60kv Circuit Diagrams\SKETCH1-REP W-O WRSP

Responses to

CEC Staff Data Requests

Data Requests 63-69: Visual Resources

Application for Certification

for the

Roseville Energy Park

Roseville, California

03-AFC-01

Submitted by

Roseville Electric

February 2004

Technical Area: Visual Resources (63-69)

Landscape Plan

63 *Provide a conceptual landscape plan that conforms with the Community Design Guidelines. The plan shall identify the tree and shrub species, as well as any other measures (e.g. berms, masonry walls, etc.), that are being proposed to screen the power plant. Please include a table on the plan that identifies for each species proposed the numbers of plants to be used, their sizes when planted (container size and height), their growth rates (feet per year), and their maximum height and spread.*

Response: The Applicant does not propose to install landscaping for the purpose of mitigating a visual impact. The City of Roseville will install landscaping along Blue Oak Boulevard and Phillip Road, but this landscaping will not be located on the REP project site and will not be part of the REP project, per se. Under the terms of the WRSP, the City, as adjacent landowner, will be responsible for providing landscaping along the west side of Phillip Road and along the south side of Blue Oak Boulevard. This landscaping will be installed in accordance with the WRSP Design Guidelines for these areas. The Design Guidelines include detailed standards for planting and a recommended planting palette.

Please note that the residences to the east (for which the landscaping will screen views of the REP, are not yet in existence and will be constructed as part of the WRSP development. It is not necessary to install landscaping in order to screen views from 4900 Phillip Road, because this residence is already screened from views of the REP by the rows of mature trees along both banks of Pleasant Grove Creek.

Plan schedule

64 *Please indicate a timeframe for when the landscaping for the REP will be installed.*

Response: The landscaping will be installed as part of the buildout of the WRSP along Blue Oak Boulevard and Phillip Road. The landscaping will be installed by the City of Roseville on City property. These landscaped areas are not located on the REP power plant site.

Building color

65 *Please discuss whether the color of the aforementioned buildings can be determined later during compliance. If the construction timeframe of the project will require the color to be selected earlier, please propose an alternative color for these buildings that would not be as light and reduce the likelihood of offsite glare.*

Response: The color of the warehouse / maintenance, administration / control, and water treatment buildings can be determined during compliance, with the intent that the colors be selected from the manufacturers' standard colors and a single color be used for the common components of these buildings.

Aluminum lagging

66 *Please discuss design measures that can be incorporated into the project that will reduce the amount of sunlight being reflected off any aluminum lagging. Please also discuss the types of finishes that will be applied to the other major structures, equipment, and buildings to ensure that the project does not create excessive glare.*

Response: The aluminum lagging visible offsite will be the corrugated or embossed type, to reduce glare and reflection. Where feasible, areas visible off site will be treated with non-reflective surfaces, including non-reflective paints, and embossed or corrugated surfaces, where these are available.

Temporary screening

67 *Please discuss whether Roseville Electric also would install temporary screening material (slats or industrial fabric mesh) on the fencing surrounding the construction laydown/parking areas to reduce the visibility of materials, equipment, and vehicles from the adjacent residential properties.*

Response: RE does not propose to install screening material on the fencing around the laydown and parking areas that is shown in Figure 2.2-2.

Exhaust flow rate/heat rejection rate

68 *Staff will model the cooling tower plumes using the data provided in the 8.1 Appendices of the AFC. Staff often recommends, for projects with unabated wet cooling towers, that the exhaust flow rate/heat rejection rate ratio that was modeled be used as a basis for a cooling tower design condition of certification. Please indicate if additional design safety factors for the exhaust flow rate and/or heat rejection rate should be considered for this project's cooling tower modeling analysis.*

Response: The cooling tower information provided in Appendix 8.1-B of the AFC is based on preliminary design data. Recognizing that Staff may recommend a condition of certification limiting the exhaust flow rate / heat rejection, the Applicant suggests that Staff allow for a margin of up to –10% on the exhaust flow rate and up to +10% on the heat rejection, to allow flexibility in the final cooling tower selection.

Cooling tower cell shut-down

69 *The data provided in Appendix 8.1B of the AFC states that under baseload, one or two cooling tower cells will be shut down under the "Cold" operating case depending on the turbine configuration. However, with the information provided, staff cannot determine at what point between 62°F and 34°F the cell(s) will be shut down. Please indicate the estimated ambient condition when the cooling tower cell(s) will be shut down for each turbine configuration.*

Response: Attachment VIS-1 contains the data originally provided in Appendix 8.1-B of the AFC with the addition of two cases for each gas turbine alternative; peak load and base load at 48 °F. These cases provide an intermediate data point between the 62 °F and 34 °F cases included in the AFC. For all peak load cases, regardless of temperature, all four fans will normally be required to operate.

For the LM6000 base load cases, four fans will normally be required to operate at 62 degrees F, three fans at 48 °F, and two fans at 34 °F. For the purpose of analyzing the project's visible

plumes, Staff may assume that the first fan is shut down at 55 °F (half way between 62 and 48 °F) and the second fan is shut down at 41 °F (half way between 48 and 34 °F).

For the GTX100 base load cases, four fans will normally be required to operate at 62 °F, four fans at 48 °F, and three fans at 34 °F. For the purpose of analyzing the project's visible plumes, Staff may assume that the first fan is shut down at 41 °F.

ATTACHMENT VIS-1

Cooling Tower Data

Roseville Energy Park

Data for Cooling Tower Plume Analysis - General Electric LM6000 PC SPRINT

	Operating Conditions							
	Hot		Average		Extra Case		Cold	
Case	**Peak**	**Base**	**Peak**	**Base**	**Peak**	**Base**	**Peak**	**Base**
Design Case								
Dry Bulb Temperature, deg. F	99.0	99.0	62.0	62.0	48.0	48.0	34.0	34.0
Wet Bulb Temperature, deg. F	70.0	70.0	53.0	53.0	45.0	45.0	32.0	32.0
Number of Combustion Turbines Operating	2	2	2	2	2	2	2	2
Combustion Turbine Load, %	100%	100%	100%	100%	100%	100%	100%	100%
Duct Burning (Yes/No?)	Yes	No	Yes	No	Yes	No	Yes	No
Site Altitude, ft	100	100	100	100	100	100	100	100
Barometric Pressure, psia	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64
Cooling Tower Data								
Allowance to WB Temp to Account for Recirculation, deg. F	2	2	2	2	2	2	-	-
Cooling Tower Design Wet Bulb Temperature, deg. F	72	72	55	55	47	47	32	32
Number of Cells	4	4	4	4	4	4	4	4
Number of Fans Operating	4	4	4	4	4	3	4	2
Leaving Air Flow/Cell, cfm	1,309,000	1,309,000	1,309,000	1,309,000	1,309,000	1,309,000	1,309,000	1,309,000
Total Leaving Air Flow, cfm	5,236,000	5,236,000	5,236,000	5,236,000	5,236,000	3,927,000	5,236,000	2,618,000
Temperature of Leaving Air, deg. F	94.3	83.1	82.5	70.4	78.0	69.3	70.0	70.2
Heat Rejected from CW, MMBtu/hr	538	242	500	250	503	250	503	253
Density of Leaving Air, lbs/cf	0.0699	0.0718	0.0719	0.0739	0.0726	0.0740	0.0739	0.0739
Exhaust Flow/Cell, lbs/min	91,464	93,923	94,060	96,678	95,029	96,904	96,763	96,713
Exhaust Flow/Cell, kg/sec	691	710	711	731	718	733	732	731
Margined Exhaust Flow, kg/sec	622	639	640	658	647	659	658	658
Tower Heat Input, MMBtu/hr	538	242	500	250	503	250	503	253
Tower Heat Input, MW	158	71	147	73	147	73	147	74
Heat Input/Cell, MW	39.4	17.7	36.7	18.3	36.9	24.4	36.9	37.1
Margined Heat Input, MW	43.4	19.5	40.3	20.2	40.5	26.9	40.5	40.8
Factor, kg/sec-MW	17.5	40.0	19.4	39.9	19.5	30.0	19.8	19.7
Margined Factor, kg/sec-MW	14.3	32.8	15.9	32.6	15.9	24.5	16.2	16.1
Minimum Factor for Peak Load Operation, kg/sec-MW	14.3							
Minimum Factor for Base Load Operation, kg/sec-MW	16.1							
Exhaust Flow Margin	-10%							
Heat Input Margin	10%							

Roseville Energy Park

Data for Cooling Tower Plume Analysis - Alstom GTX100

	Operating Conditions							
	Hot		Average		Extra Case		Cold	
Case	**Peak**	**Base**	**Peak**	**Base**	**Peak**	**Base**	**Peak**	**Base**
Design Case								
Dry Bulb Temperature, deg. F	99.0	99.0	62.0	62.0	48.0	48.0	34.0	34.0
Wet Bulb Temperature, deg. F	70.0	70.0	53.0	53.0	45.0	45.0	32.0	32.0
Number of Combustion Turbines Operating	2	2	2	2	2	2	2	2
Combustion Turbine Load, %	100%	100%	100%	100%	100%	100%	100%	100%
Duct Burning (Yes/No?)	Yes	No	Yes	No	Yes	No	Yes	No
Site Altitude, ft	100	100	100	100	100	100	100	100
Barometric Pressure, psia	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64
Cooling Tower Data								
Allowance to WB Temp to Account for Recirculation, deg. F	2	2	2	2	2	2	-	-
Cooling Tower Design Wet Bulb Temperature, deg. F	72	72	55	55	47	47	32	32
Number of Cells	4	4	4	4	4	4	4	4
Number of Fans Operating	4	4	4	4	4	4	4	3
Leaving Air Flow/Cell, cfm	1,309,000	1,309,000	1,309,000	1,309,000	1,309,000	1,309,000	1,309,000	1,309,000
Total Leaving Air Flow, cfm	5,236,000	5,236,000	5,236,000	5,236,000	5,236,000	5,236,000	5,236,000	3,927,000
Temperature of Leaving Air, deg. F	95.2	85.9	85.3	73.5	81.0	67.9	73.4	65.8
Heat Rejected from CW, MMBtu/hr	566	310	566	310	566	310	566	324
Density of Leaving Air, lbs/cf	0.0697	0.0713	0.0714	0.0733	0.0721	0.0743	0.0734	0.0746
Exhaust Flow/Cell, lbs/min	91,262	93,322	93,459	96,005	94,398	97,198	96,030	97,647
Exhaust Flow/Cell, kg/sec	690	706	707	726	714	735	726	738
Margined Exhaust Flow, kg/sec	621	635	636	653	642	661	653	664
Tower Heat Input, MMBtu/hr	566	310	566	310	566	310	566	324
Tower Heat Input, MW	166	91	166	91	166	91	166	95
Heat Input/Cell, MW	41.4	22.7	41.4	22.7	41.4	22.7	41.4	31.6
Margined Heat Input, MW	45.6	25.0	45.6	25.0	45.6	25.0	45.6	34.8
Factor, kg/sec-MW	16.7	31.1	17.1	32.0	17.2	32.4	17.5	23.4
Margined Factor, kg/sec-MW	13.6	25.4	14.0	26.1	14.1	26.5	14.3	19.1
Minimum Factor for Peak Load Operation, kg/sec-MW	13.6							
Minimum Factor for Base Load Operation, kg/sec-MW	19.1							
Exhaust Flow Margin	-10%							
Heat Input Margin	10%							

Responses to

CEC Staff Data Requests

Data Requests 70-71: Waste Management

Application for Certification

for the

Roseville Energy Park

Roseville, California

03-AFC-01

Submitted by

Roseville Electric

February 2004

Technical Area: Waste Management (70-71)

Phase I ESA

70 *Please provide a Phase I ESA for the 6 mile 10 -16-inch diameter underground natural gas pipeline corridor which, according to ASTM 2000 guidelines, contains a statement of conclusions and a recommendation of either no further action or for Phase II ESA sampling and analysis and the reasons which support the recommendation and includes:*

a) Property where contamination is known, or suspected at an up-gradient or adjoining site.

b) Property which is, or has been used for industrial/manufacturing purposes. Adjoining property with this type of usage should also be included in the investigation.

c) Property for which any prior environmental investigation indicated the potential for contamination.

d) Property displaying evidence of hazardous waste storage on site, whether permitted or not. For example, the existence of a former dry cleaner or gas station which utilized underground or above ground storage tanks. Agricultural properties, where pesticides were stored/mixed and potentially released, should also be investigated.

e) Property with visible staining.

f) Property where contaminants exceeding drinking water standards have been detected.

g) Property where state / federal agency notices of violation have been issued.

h) Property on which equipment containing PCBs was stored.

i) Property where fill dirt has been brought that has, or may have originated from a contaminated site.

j) Property with known or suspected discharges of wastewater (other than storm-water and sanitary waste) into a storm water drain.

k) Property with an environmental lien on it (imposed either by CERCLA 42USC / 9607(1) or similar state and local laws).

l) Property along existing or past railroad tracks.

Response: Information regarding potential contamination at the project site and along the natural gas pipeline is being prepared and will be provided in a future submittal. The AFC contains a Phase I Environmental Site Assessment of the project site and several, City-owned, adjacent parcels.

Pesticide Assessment

71 *For agricultural areas, please provide a representative sample (at least 10 percent) of all parcels randomly selected for a Determination of Pesticide Use assessment. The assessment shall identify the type of crops grown over as long a period as records indicate, the historical use and identity of pesticides (including organic and inorganic pesticides as well as herbicides), and a statement of the*

likelihood of finding along the pipeline route levels of pesticides which might present a risk to pipeline workers and/or the public

Response: An assessment of potential pesticide contamination is under preparation and will be provided in a future filing.

BEFORE THE
ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE ROSEVILLE ENERGY PARK	)	DOCKET NO. 03-APC-1
	)	
	)	PROOF OF SERVICE LIST
BY THE CITY OF ROSEVILLE	)	(*REVISED JANUARY 14, 2004)
	)	

I, **Anar Bhimani,** declare that on **February 6, 2004,** I deposited copies of the attached **Roseville Energy Park Application for Certification Data Request Responses** in the United States mail at Sacramento, CA with first class postage thereon, fully prepaid, and addressed to the following:

DOCKET UNIT

The original signed document plus the required 12 copies to the Energy

CALIFORNIA ENERGY COMMISSION
DOCKET UNIT, MS-4
Attn: Docket No. 02-APC-4
1516 Ninth Street
Sacramento, CA 95814-5512
docket@energy.state.ca.us

In addition to the documents sent to the Commission Docket Unit, also send individual copies of any documents to:

APPLICANT

Tom Habashi, Executive Director
Roseville Electric
2090 Hilltop Circle
Roseville, CA 95747
thabashi@roseville.ca.us

Robert Hren, Project Manager
Roseville Electric
2090 Hilltop Circle
Roseville, CA 95747
rhren@roseville.ca.us

*CONSULTANTS FOR APPLICANT

Doug Davy
TetraTech FW, Inc.
3427 Lennane Drive, Suite 200
Sacramento, CA 95834
DDavy@ttfwi.com

Andrea Grenier
Grenier & Associates, Inc.
1108 Kris Way
Roseville, CA 95661
andrea@agrenier.com

COUNSEL FOR APPLICANT

Scott Galati
Galati and Blek, LLP
555 Capitol Mall, Suite 600
Sacramento, CA 95814
sgalati@gb-llp.com

*INTERESTED AGENCIES

Patty Dunn
Assistant City Manager
City of Roseville
311 Vernon Street
Roseville, CA 95678
pdunn@roseville.ca.us

INTERVENORS

Adams Broadwell Joseph & Cardozo
California Unions for Reliable Energy
Att: Mark D. Joseph and Tanya A. Gulesserian
651 Gateway Boulevard, Suite 900
South San Francisco, CA 94080
mdjoseph@adamsbroadwell.com
tgulesserian@adamsbroadwell.com

I declare under penalty of perjury that the foregoing is true and correct.

[signature]

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